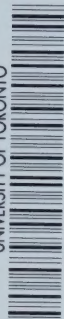


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Journal

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**Barodontalgia /
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Journal

July/
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The SuperMat Retainerless Matrix System, with SuperMat spools, is available through an authorized dealer - *your satisfaction is guaranteed by Premier.*



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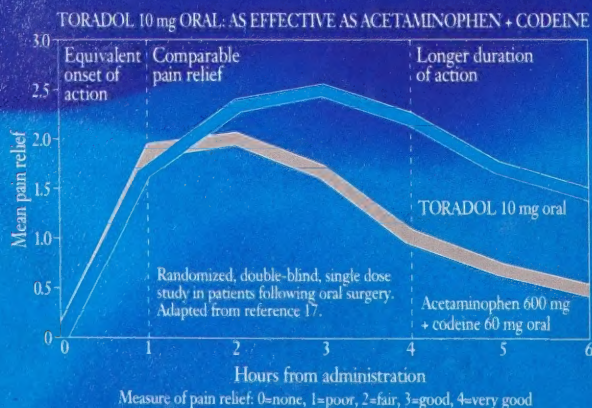
TORADOL

Providing highly effective relief in acute dental pain.



Current strategies in acute pain management suggest a non-narcotic analgesic should be used first, before a narcotic is considered.³⁰

Toradol (ketorolac tromethamine) oral has been proven effective in acute post-dental surgical pain such as third molar extraction pain and mandibular pain.^{17,18,62} Toradol may also provide effective relief for your patients suffering from toothache pain and endodontic/periodontic pain.



Unlike narcotics which work at the CNS, Toradol works peripherally, at the site of the pain,^{2,3,58} and therefore has a lower incidence of nausea, dizziness, drowsiness and constipation.^{17,18,21,22} The lower CNS side effects may be of particular benefit to patients who need to drive, operate machinery and remain alert or active.

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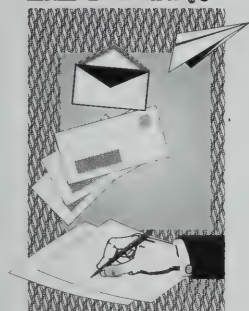
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10 mg tablets & 30 mg/mL IM injections • KETOROLAC TROMETHAMINE

Effectively treating acute pain

Treatment not to exceed 7 days for musculoskeletal pain. Post-surgical patients not to exceed 5 days.

LETTERS



Living Together

The Editorial, Living Together for Better or for Worse, in the May 1996 issue of the *Journal* was very well written (Crawford, P.R. 62:387, 1996). Not 10 minutes before I read the editorial, I had just completed an article entitled "Hiring and Keeping an Associate," which will be featured in the October 1996 issue of *Dental Economics*. It is sad that so many associates are treated unfairly by senior dentists and often times the staff (who take the lead from the senior dentist).

Linda L. Miles
Virginia Beach, Virginia.

Oralife

The May 1996 issue of the *Journal* included a President's Column entitled "Oralife Managed Care Plan Is A No Go (Brookfield, J.R. 62:389, 1996). I was shocked that our president would present such a biased and inaccurate editorial, and felt compelled to present another point of view. I, for one, do not feel that Knowell Therapeutics and Oralife Inc. pose a threat to our profession. Rather, I feel that they have developed tools which could have tremendous impact on furthering preventive dentistry and helping dentists render better patient care.

Our president has shown poor judgment in this editorial. He has indeed used quotes from Oralife documents, but has taken these quotes and used them out of context

to support his point of view. I would encourage anyone who read and believed all or part of the editorial's content to seek out the original documents and read for themselves.

Knowell Therapeutics has made a real effort to make dentists aware of their products. Many of us have not taken the time to read their manuals and evaluate the research which has been done. As always, we are reluctant to change, but without change, progress does not occur.

Dr. Brookfield stated that three principles are at stake. He is mistaken on all three counts. Oralife does not want to involve itself with regulating how we practise. Nor do they want to have us following cook-book treatment plans for our patients. They have also made their products available to all Canadian dentists and have no interest in setting up preferred provider networks.

I urge all of you to disregard our president's message and take the opportunity to become aware of Knowell Therapeutics and their products and decide for yourselves whether they have an application in your practice.

William McJannet, DDS
Pointe Claire, Quebec.

I read the May President's Column with great interest and a certain disquiet. I agree that the dental profession has to position and brace itself against the insidious attempts to bring managed-care types of dental plans to our communities.

Dr. Brookfield mentioned that there is a CDA-sponsored public education program to educate employers and the public. I believe that something like this has to be done, and I am reminded of a recent conversation with a patient involved in negotiations for union employee benefits. She pointed out that the management was recommending a reduced benefits dental plan with a nine-month recall scheme. She had the perception to protest that this was in effect a decrease in dental care. The response to her was that

six-month recalls were really not necessary, and that dentists insisted on this because they were greedy.

I have heard from anecdotal sources that insurance companies try to portray dentists and dentistry in an unflattering light. Even the phrases associated in the promoting of managed care use terms such as "plans to make dentistry more affordable," implying that present dental treatment is exorbitant in cost.

These types of allegations are sometimes difficult to prove because such comments are not written. Nevertheless, any negative images spread by the powerful insurance health interests are difficult to respond to by the individual dental practitioner.

This is where I feel that a high-profile campaign to educate the public and employees is necessary, as these events continue to unfold. Will the CDA be able to address these issues in an effective way?

Arthur A. Galwin, DDS
Ottawa, Ontario.

In the May issue of the *CDA Journal*, the President's Column contained what many might consider to be a complete repudiation of Oralife and its approach to risk assessment and disease management. Dr. Brookfield takes a number of selected quotes from the company's prospectus, but fails to recognize the bedrock of the company's business, which is preventive care based on the recognition that both dental caries and periodontal disease have been clearly identified as infectious disease, which therefore can and should be managed medically, at least in the first instance.

I draw your attention to a recent review article in the June 1995 issue of the *Journal of the American Dental Association* by Dr. Anusavice, which analyzes caries diagnosis and risk assessment in detail and concludes that: "Individualized, risk-based approaches to caries prevention are scientifically justified given current caries patterns."

TORADOL®

10 mg tablets & 30 mg/mL IM injections KETOROLAC TROMETHAMINE

Effectively treating acute pain

TORADOL® (ketorolac tromethamine) 10 mg tablets

TORADOL® IM (ketorolac tromethamine injection) 10 mg/mL or 30 mg/mL intramuscular injection

NSAID Analgesic Agent

Toradol (ketorolac tromethamine) is a non-steroidal anti-inflammatory drug (NSAID) that exhibits analgesic activity mediated by peripheral effects.

INDICATIONS

Oral Route: Indicated for the short-term management (not to exceed 5 days for post-surgical patients or 7 days for patients with musculoskeletal pain) of moderate to moderately severe acute pain, including post-surgical pain (such as general, orthopaedic and dental surgery), acute musculoskeletal trauma pain and post-partum uterine cramping pain. (See WARNINGS and DOSAGE AND ADMINISTRATION)

Intramuscular Route: Indicated for the short-term management (not to exceed 2 days) of moderate to severe acute pain, including pain following major abdominal, orthopaedic and gynecological operative procedures. The total duration of combined intramuscular and oral treatment should not exceed 5 days.

CONTRAINDICATIONS

Hypersensitivity: Has been associated with hypersensitivity reactions and should not be used when there is a known or suspected hypersensitivity to the drug. Should be discontinued in patients who develop symptoms of hypersensitivity during therapy. Should not be used in patients with the complete or partial syndrome of nasal polyps, angioedema, bronchospastic reactivity (e.g. asthma) or other allergic manifestations to acetylsalicylic acid (ASA) or other non-steroidal anti-inflammatory drugs. Severe and fatal anaphylactoid reactions have occurred in such individuals.

Gastrointestinal: Should not be used in patients with suspected or confirmed, or a history of, peptic ulcer disease, gastrointestinal bleeding or perforation, or active inflammatory disease of the gastrointestinal system.

Renal Impairment: Contraindicated in patients with moderate to severe renal impairment or in patients at risk for renal failure due to volume depletion.

Haemorrhagic Risk: Contraindicated immediately before any major surgery, and intraoperatively when hemostasis is critical. Contraindicated in patients with coagulation disorders, postoperative patients with high haemorrhagic risk or incomplete haemostasis, and in patients with suspected or confirmed cerebrovascular bleeding.

Obstetrics: Contraindicated in labour and delivery.

Neuraxial Administration: IM route is contraindicated for neuraxial (epidural or intrathecal) administration due to its alcohol content.

Concomitant Medications: Contraindicated in patients currently receiving ASA or NSAIDs. Concomitant use with probenecid is also contraindicated.

WARNINGS

Long-term administration is not recommended.

The most serious risks associated with NSAIDs including 'Toradol' are:

Gastrointestinal Ulcerations, Bleeding and Perforation: Serious gastrointestinal toxicity, such as bleeding, ulceration, and perforation, can occur at any time, with or without warning symptoms. The incidence of gastrointestinal complications increases with dosage and duration of treatment. Elderly and debilitated patients are more susceptible to these complications. To date, studies with NSAIDs have not identified any subset of patients not at risk for developing peptic ulceration and bleeding. Most spontaneous reports of fatal gastrointestinal events with 'Toradol' are in the aged population.

Renal Toxicity: Contraindicated in patients with moderate to severe renal impairment. Acute renal failure, nephrotic syndrome, interstitial nephritis, and renal papillary necrosis have been reported. Elevations of blood urea nitrogen (BUN) and creatinine have been reported.

Hypovolemia should be corrected before treatment is initiated since acute renal failure may be precipitated. Predisposing factors for decreased renal blood flow perfusion include dehydration, sepsis, impaired renal function, heart failure, liver dysfunction, diuretic therapy, and advanced age. Caution is advised in such circumstances. Close monitoring of urine output, serum urea and serum creatinine is recommended until renal function recovers.

Fluid Retention and Edema: Fluid retention, edema, NaCl retention, oliguria, elevations of serum urea nitrogen and creatinine have been observed. The possibility of precipitating congestive heart failure in elderly patients or those with compromised cardiac function should be considered. Should be used with caution in patients with cardiac decompensation, hypertension or other conditions which cause a predisposition to fluid retention.

Haemorrhage: Postoperative haematomas and other symptoms of wound bleeding have been reported in association with intramuscular use. Contraindicated in patients who have coagulation disorders. Careful observation is advised in patients receiving drug therapy that interferes with haemostasis.

Concurrent use with low dose heparin (2500-5000 units q12h), warfarin and dextrans may be associated with an increased risk of bleeding.

In patients receiving anticoagulants, the risk of intramuscular haematoma formation from IM injections is increased.

Hypersensitivity Reactions: The possibility of severe or fatal hypersensitivity reactions should be considered. Counteractive measures must be available when administering the first IM dose. Patients should be questioned for history of allergy to NSAIDs or ASA or for the syndrome consisting of nasal polyps, ASA allergy and asthma.

Use in Pregnancy and Lactation: Not recommended during pregnancy or lactation.

Use in Children: Not recommended for use in children under age 16. Safety and efficacy in children have not been established.

Use in the Elderly: Extra caution and the lowest effective dose should be used.

PRECAUTIONS

Physicians should be alert to the pharmacologic similarity of Toradol (ketorolac tromethamine) to other non-steroidal anti-inflammatory drugs that inhibit cyclo-oxygenase.

Gastrointestinal Effects: Close medical supervision is recommended in patients prone to gastrointestinal tract irritation.

Patients taking any NSAID including ketorolac tromethamine should be instructed to contact a physician immediately if they experience symptoms or signs suggestive of peptic ulceration or gastrointestinal bleeding. These reactions can occur at any time during the treatment. If peptic ulceration is suspected or confirmed, or if gastrointestinal bleeding occurs, Toradol should be discontinued and appropriate treatment instituted with close patient monitoring.

Hepatic Effects: Caution should be observed in patients with impaired hepatic function, or a history of liver disease. May cause elevations of liver enzymes, and, in patients with pre-existing liver dysfunction, may lead to the development of a more severe hepatic reaction. Meaningful elevations of serum transaminases occurred in controlled clinical trials in less than 1% of patients. If clinical signs and symptoms consistent with liver disease develop, or if systemic manifestations occur 'Toradol' should be discontinued. Patients with impaired hepatic function from cirrhosis do not have any clinically important changes in clearance. Studies in patients with active hepatitis or cholestasis have not been performed.

Hematologic Effects: Inhibits platelet function and may prolong bleeding time. Inhibition of platelet function is normalized within 24 to 48 hours after discontinuation.

Blood dyscrasias are rare, but could occur with severe consequences.

Infection: May mask the usual signs of infection.

DRUG INTERACTIONS

'Toradol' is highly bound to human plasma protein (99.2%) however, since it is present in low concentrations in plasma, it would not be expected to displace other protein-bound drugs significantly. Digoxin, warfarin, acetaminophen, phenytoin, and tolbutamide did not alter ketorolac tromethamine protein binding.

In vitro binding of warfarin to plasma proteins was slightly reduced by ketorolac tromethamine (99.5% → 99.3%).

Prothrombin time should be carefully monitored in patients receiving oral anticoagulants concomitantly with ketorolac tromethamine.

Given with heparin mean template bleeding time increased from 6.0 minutes to 6.4 minutes.

Ketorolac tromethamine does not alter digoxin protein binding.

In vitro, salicylates reduce binding of ketorolac tromethamine (99.2% → 97.5%) representing a two-fold increase in unbound 'Toradol' plasma levels.

There is no evidence (animal or human) that ketorolac tromethamine induces or inhibits hepatic enzymes.

Probenecid decreases the clearance of ketorolac and increases ketorolac plasma levels, (3-fold) and half-life (2-fold). Concomitant use of 'Toradol' and probenecid is contraindicated.

Ketorolac tromethamine reduces the diuretic response to furosemide (20%).

Some NSAIDs inhibit clearance of lithium and methotrexate, and increase plasma lithium and methotrexate concentrations and potential toxicities. The effect of ketorolac tromethamine on lithium or methotrexate clearance has not been studied.

Use of ACE inhibitors and NSAIDs may increase risk of renal impairment particularly in volume depleted patients.

IM 'Toradol' has been administered with morphine in studies without evidence of adverse interactions.

ADVERSE EVENTS

For adverse events occurring at an incidence of 1% or less during clinical trials, and adverse events reported post-marketing, consult the Product Monograph.

TORADOL TABLETS

Short-Term Patient Studies (Less than two weeks)

Incidence Between 4 and 9%: Nervous System: Somnolence, insomnia **Digestive System:** Nausea **Incidence Between 2 and 3%: Nervous System:** Nervousness, headache, dizziness **Digestive System:** Diarrhea, dyspepsia, gastrointestinal pain, constipation **Body As A Whole:** Fever

Long-Term Patient Study (Approximately one year)

Incidence Between 10 and 12%: Digestive System: Dyspepsia, gastrointestinal pain

Incidence Between 4 and 9%: Digestive System: Nausea, constipation **Nervous System:** Headache

Incidence Between 2 and 3%: Digestive System: Diarrhea, flatulence, gastrointestinal fullness, peptic ulcers

Nervous System: Dizziness, somnolence **Metabolic/Nutritional Disorder:** Edema

TORADOL IM

Incidence Between 10 and 13%: Nervous System: Somnolence **Digestive System:** Nausea

Incidence Between 4 and 9%: Nervous System: headache **Digestive System:** vomiting

Injection Site: injection site pain

Incidence Between 2 and 3%: Nervous System: sweating, dizziness **Cardiovascular System:** vasodilatation

DOSAGE AND ADMINISTRATION

Adults:

Oral: Usual dose is 10 mg every 4 to 6 hours as required. Doses exceeding 40 mg per day are not recommended.

Maximum duration of treatment is 5 days for post-surgical patients and 7 days for patients with musculoskeletal pain.

Intramuscular: Usual initial dose is 10-30 mg, according to pain severity. Subsequent dosing may be 10 mg to 30 mg every 4-6 hours as needed. The lowest effective dose should be administered.

IM administration should be limited to short-term therapy (not over 2 days). Total daily dose should not exceed 120 mg. If supplementary analgesia is required, a concomitant low dose of opiate can be used.

Patients Under 50 kg, Over Age 65 years, or With Less Severe Pain at Baseline:

Oral: Lowest effective dose recommended.

Intramuscular: Lower end of the dosage range recommended. Initial dose 10 mg. Total daily dose should not exceed 60 mg.

Impaired Renal Function: Not recommended for patients with moderate to severe renal impairment.

Conversion from Parenteral to Oral Therapy: Toradol tablets may be used either as monotherapy or as follow-on therapy to parenteral ketorolac.

Follow-on Therapy: Total combined daily dose, oral + parenteral, should not exceed 120 mg in younger adult patients or 60 mg in elderly patients on the day the change of formulation is made. On subsequent days, oral dosing should not exceed 40 mg. Toradol IM should be replaced by an oral analgesic as soon as feasible.

Total duration of combined intramuscular and oral treatment should not exceed 5 days.

AVAILABILITY OF DOSAGE FORMS

Oral Dosage Forms

Available as 10 mg white round film-coated tablets with one side printed red with 'Toradol' inside bold T and other side with Syntex in bottles of 100 and 500 tablets.

IM Dosage Forms

Also available in 1 mL ampoules (trays of 10) containing 10 or 30 mg/mL.

'Toradol' (ketorolac tromethamine) is a schedule F drug.

For full prescribing information refer to the product monograph. The product monograph is available upon request.

References: 2. TORADOL Product Monograph, Syntex Inc., Dec. 1992. 3. Rooks WH II. *Pharmacother* 1990; 10(6 Pt 2):305-325. 4. Yee JP et al. *Pharmacother* 1986; 6(5):253-61. 5. Brown CR et al. *Pharmacother* 1990; 10(6 Pt 2):455-505. 6. O'Hara DA et al. *Clin Pharmacol Ther* 1987; 41:556-61. 7. Fragen RJ. Data on File, Syntex Inc., Document CL3837, 1987. 8. Cherry C et al. Data on File Syntex Inc., Document CL3835, 1987. 9. Stanski DR et al. *Pharmacother* 1990; 10(6 Pt 2):405-445. 10. Data on File, Syntex Inc., Document #90027-1, 1989. 13. Stahlgren L. Data on File, Syntex Inc., Document RS-37619, 1991. 16. Data on File, Syntex, Document #90027-2, 1989. 17. Forbes JA et al. *Pharmacother* 1990; 10(6 Pt 2): 775-935. 18. Forbes JA et al. *Pharmacother* 1990; 10(6 Pt 2): 945-1055. 21. Data on File, Syntex Inc., Document #90027-3, May 1990. 22. Mehlich D et al. Data on File, Syntex Inc., Document CL3686, 1986. 23. Oosterlinck W et al. *J Clin Pharmacol* 1990;30: 336-41. 24. Cutting CJ et al. Data on File, Syntex Inc., Document CL4740, 1989. 25. Diebschlag W and Nocker W. Data on File, Syntex Inc., Document CL5468, 1990. 26. Molinie J et al. Data on File, Syntex Inc., Document CL4624, 1988. 27. Herrera JMC et al. Data on File, Syntex Inc., Document CL4886, 1989. 30. American Pain Society. *Principles of Analgesic Use in the Treatment of Acute Pain and Cancer Pain*, 3rd edition, 1992. 36. Huttman W et al. Data on File, Syntex Inc., Document CL4882, 1989. 38. Bloomfield S et al. *Pharmacother* 1986;6(5):247-52. 39. Sunshine A et al. Data on File, Syntex Inc., Document CL3674, 1986. 46. Vangen O et al. *J Int Med Res* 1988; 16:443-51. 48. Brown J *Clin Pharmacol Ther* 1993;53:222. 52. Cataldo PA et al. *Surg Gynecol Obstet* 1993;176:435-8. 54. Indiaar H et al. Data on File, Syntex Inc., Document CL3549, 1986. 55. Yee JP et al. Data on File, Syntex Inc., Document CL3849, 1987. 56. Tommerasen M et al. *Surg Forum* 1992;43:510-2. 57. Steele R and Durwood EN Jr. *South Med J* 1992;85:35-103. 58. Forrest JB et al. *J Dev Clin Med* 1992;10(3):129-50. 59. Stahlgren L et al. *Clin Ther* 1993; 15(3):570-80. 60. Launo C et al. *Minerva Anestesiol* 1991;57:1092-3. 61. Bosek V et al. *J Clin Anesth* 1992;4:480-3. 62. Fricke J et al. *Clin Ther* 1993; 15(3):500-507.

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I also draw your attention to the recent study by Dr. Loesche, supported by the National Institute for Dental Research, which has shown that scaling combined with antibiotic therapy saved over 80 per cent of teeth initially diagnosed for surgical treatment. There can be little argument that the literature shows that both dental diseases are infective and amenable to medical treatment.

Unfortunately, at the present time there is little financial incentive for the dental practitioner to treat his or her patients in this way, as the economic basis of dental practice is based on the reparative and surgical model.

What Oralife has set out to do is to persuade insurance carriers to expand coverage to recognize this new approach to dental treatment, coupled to a program which enables the practitioner to identify those patients at high risk for which the carrier will provide fuller coverage. Conversely, the low-risk patient making less demand on the carrier will also be identified.

In other words, our program will contain current costs by distributing them more rationally without compromising the quality of care provided.

Pivotal to our program is the ability of the practitioner to identify patients as being at high, medium or low risk to dental disease, so that treatment can be appropriately planned. To this end, Oralife has developed a software program which will enable the dentist to input his or her clinical assessment, together with the patient's past claims history, to give them the choice of selecting reimbursable treatments at established fee guides, with no discounting, which will provide the best treatment for the patient. Unfortunately, Dr. Brookfield has linked our program with managed care programs available in the U.S. and suggests that it is a preferred provider program and that practitioners will surrender their ability to diagnose and treat patients as they judge best. Both implications are simply wrong.

Your readers should also note that the president of the American Dental Association testified before a

Congressional House Committee on May 30th, this year, demanding that:

1. Patients must have the right to seek care from any provider (dentist) network and receive reimbursement for this.
2. Every health plan provide fair and reasonable procedures for appeal.
3. Health plans must provide patients with plainly written information about a) exactly what is covered; b) the solvency of the plan; and c) a history of patient satisfaction of the plan.
4. Health plans must provide adequate numbers of qualified generalists and specialists.
5. Health plans must not prohibit professionals from discussing treatment alternatives.

Every one of these demands is not only fully compatible with the Oralife plan, but in fact are key features of its strategy.

Whatever, the bottom line in my mind is the ability of the profession to deliver appropriate dental care and I ask whether it can ignore the overwhelming evidence that dental disease can be treated medically. I suggest that it is only a matter of time before the public learns about this new approach and who better than the CDA to promote and endorse it as the collective voice of a proven progressive health care profession?

Oralife is in business, and an essential part of that business is to ensure that the profession is compensated for this inevitable shift in the way dental health care will be delivered in the future. And if not Oralife, the profession must recognize that others will seek to take advantage of a developing market with less commitment to the preventive strategies endorsed by the company that I chair.

*Dr. Richard Ten Cate, chairman
Oralife Group
Toronto, Ontario.*

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CANADIAN DENTAL SERVICE PLANS INC.

Journal

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Guideline Development

It was an exceptionally harsh winter in Northwestern Ontario. Not only did the thermometer dip below minus 38 too often, but sudden snow storms of up to 55 cm turned several trips to the Royal College of Dental Surgeons of Ontario (RCDS) quality assurance committee meetings in Toronto into quite the adventures. When it is extremely cold, and the wind suddenly whips up the surface snow, visibility can become wishful thinking in an instant. A double yellow line on the windswept highway can be a real lifesaver.

If I were asked to choose a metaphor for dental practice guideline development, I would recommend the analogy of painting highway centre lines and placing road direction, help and hazard signs where required. Their intent is simply to make travel safer, and although not everyone agrees where dotted and double lines should be, and although they do theoretically restrict our freedom to pass when we like, the vast majority of drivers would feel far less safe without them.

Could not the same be said about dental practice guidelines? In dentistry, quality guidelines are still few and far between. How can we begin to offer any measure of quality assurance to the public with so little painted on the road? Just because we are used to driving without them, doesn't mean they wouldn't be helpful. My impression is that it is not unreasonable for the members of the public to expect some guidance from the profession on the use of all dental services and licensed acts. If we expect patients to follow our professional advice, accept our treatments, and visit us regularly for preventive or conservative care, then it seems reasonable that we should attempt to define what is appropriate dental care, what is questionable, and what is not. It seems to me, that by gathering together a broad cross-section of prominent dental clinicians, educators, and researchers, we should be able to at least find the middle of the road, and possibly even discuss the limiting parameters of the shoulders. It might even spark some university research in areas where there is little consensus or supporting scientific evidence.

I have always been proud of the fact that dentistry is a leader among the health care professions and that it was the first of the traditional health care professions to make prevention its hallmark. Witness the dramatic reduction in dental disease and the remarkable improvement in dental public health since the turn of the century. It is my personal belief that the quality of care in Canadian dentistry is just about the best in the world, and if we had verifiable evidence-based guidelines that lead to positive health outcomes, we would even be able to prove it.

*William K. Hettenhausen, DDS
Thunder Bay, Ontario.*

Ottawa HIV Discrimination Case

Although the comments expressed in the Guest Editorial and It's My Opinion columns published in the June 1996 issue of the *Journal* provide an interesting point of view, we believe that members should receive factual information about the application of the Human Rights Code in Ontario (Christensen, R.P. Infection Control Procedures — Who Should Decide What Cannot Be Used. 62:471-473, 1996; Graham, P.E. and Harel-Raviv, M. The Law and Ethics Regarding Infection Control In Treating HIV-Positive Patients. 62:475, 1996).

As the national voice for dentistry, we believe that CDA should confirm that patients must be treated equally under the Human Rights Code.

As a corporate member of CDA, it is our understanding that CDA developed and approved an evidenced-based infection control policy on the use of universal precautions. According to the scientific evidence on the transmission of blood-borne pathogens, the adoption of an infection control policy based on universal precautions protects patients, dental staff and dentists. In reconfirming its position on infection control practices, CDA released a statement which reported: "Universal precautions, the foundation of CDA's policies on infection control, continues to be the most effective approach to preventing the transmission of disease. Scientific studies have not provided any basis for challenging the impressive evidence that universal precautions work."

It is indeed unfortunate, that the *CDA Journal* is now providing commentary that questions the benefit of universal precautions. The Ontario Dental Association (ODA) is concerned that members reading these opinion items may believe that it is neither necessary nor beneficial to employ universal precautions. We believe that the two opinion items send a very confusing message to members about current policies and guidelines, and about the appropriateness of relying on evidenced-based infection control guidelines.

Recently, representatives of the ODA and the Royal College of Dental Surgeons of Ontario (RCDS) met with a director of the Ontario Human Rights Commission. During our discussion, the commission reiterated the importance that it attaches to continued adherence to the principles and practice of universal precautions.

*Dr. Elizabeth MacSween,
president
Ontario Dental Association*

Editor's Response

As Dr. MacSween rightly pointed out, CDA has developed specific "Recommendations for Infection Control Procedures," which are based on the principle of universal precautions. We continue to advocate and support the use of universal precautions with all patients.

The two columns Dr. MacSween refers to in her letter were both opinion pieces that represent the views of their respective authors, not those of CDA. Although we realized from the outset that both columns were controversial, we believed they would promote healthy debate, and possibly lead to an examination of current infection control policies as well as health rights issues.

There are a number of issues at stake, here. First, should dentists have the right to treat known infectious patients using a common sense approach and their best clinical judgment? And, second, do current discrimination laws leave dentists at risk of being preyed upon by infectious patients seeking a fast dollar?

These questions remain to be answered. But until they are, universal precautions remain the standard of practice.

*P. Ralph Crawford, BA, DMD
Editor, Journal of the Canadian
Dental Association*



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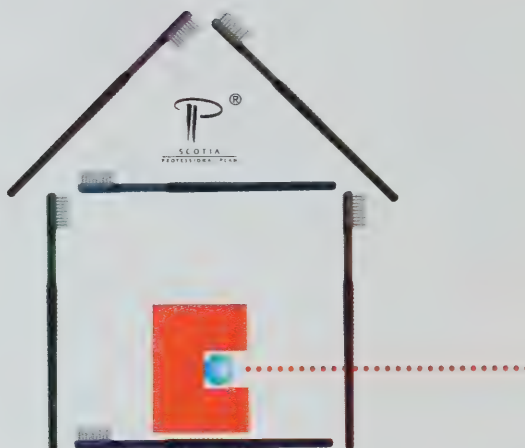
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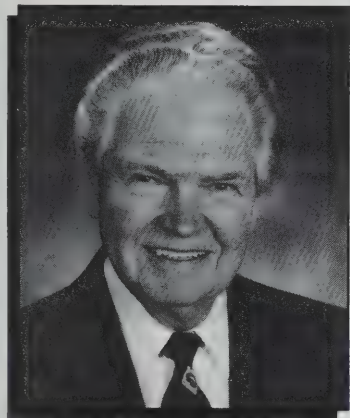
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IS IT WORTH THE RISK?



Dr. P. Ralph Crawford,
Editor

When the great American humorist Will Rogers said, "All I know is just what I read in the papers," I am not sure he was thinking about how the public deals with risk.

In the last few weeks, reading my morning paper, I've come to the conclusion that the public's grasp of risk-taking is all out of balance. On one hand, people readily take life-threatening risks every day. On the other, they demand zero risk when the potential for harm is already minuscule.

In Ottawa, for example, a 26-year-old in-line skater died of the head injuries he suffered during a fall. He was not wearing a helmet. A few days later, in separate automobile accidents, two young women were killed. They were not wearing seat belts. It is impossible to know if a helmet would have saved the skater, or if the women would have survived if they'd buckled up. But the risks of going helmetless or beltless are so obvious and so well known, it's hard to fathom why anyone would do so.

A recent *Globe and Mail* story reported that only 25 per cent of the Canadians who participated in a survey investigating the sex habits of 10,000 people from around the

world used condoms in every casual sexual encounter. Given the huge effort to educate the public about HIV, and all the information that's available about unwanted pregnancies and sexually-transmitted diseases, it is shocking to think that 75 per cent of Canadians willingly put themselves at risk every time they engage in a casual sexual encounter.

And what about smoking. The World Health Organization released a study on May 23, 1996, that put the risk of smoking into graphic perspective. WHO estimates that smoking-related deaths will rise from their current level of three million per year to reach 10 million per year by early in the next century. The same study shows that tobacco use kills 50 per cent of all smokers, and that one person dies every 10 seconds as a result of tobacco use.

Now consider some of the risks that people are not willing to take.

For weeks this Spring, the world press was consumed by a possible link between British beef and Creutzfeldt-Jakob disease. Although scientists insisted that the consumption of British beef poses a very, very small risk, it was still enough to literally close down the entire beef industry in the United Kingdom, endanger the lives of tens of thousands of cattle, and threaten the livelihood of thousands of Englishmen.

The same may be said of dental amalgam. Based on the available scientific evidence, the risk that patients take when they accept dental amalgam restorations is minuscule, and it is largely relegated to an extremely small segment of society. Despite this, there are naysayers who would like to see amalgam banned from the face of the earth. I wonder what these people will think about the recent study out of Tufts University, which showed that resin-based composites and sealants demonstrate an estrogen-like activity in tissue cultures of breast tumor cells.

Dental unit water lines have also been in the headlines recently. Media reports have focussed on the risk of disease transmission to patients via dental unit water, and on

the potential for biofilms of infectious microbes to form in dental unit water lines. The research is not conclusive. To date, most reports have shown a "possible" risk, and concluded that further research is needed.

Nevertheless, dentists are being labelled as the bad guys. This is unfortunate. We are already doing everything that is possible and practical to make dentistry risk free. But the reality may well be that zero risk anything is an impossible dream.

When it comes to risk, we come up against a real quirk in human nature. Some people are willing to accept the most stupid risks, even those that can be controlled — "I know it says right on the cigarette box that smoking will kill me, but it is my choice." In other situations, however, despite the danger being extremely small and largely out of their control, people demand zero risk — "Don't put any of that mercury into my mouth."

I have no solution to the quirkiness of human nature. Like Will Rogers, I'll rely on what I read in the papers. As for risk, I particularly like what Douglas Hurd, the British Conservative MP and one-time British foreign secretary, said in a recent *Globe and Mail* column.

"The fact that a risk is new does not mean that it is more serious than the familiar risks we know that we and our children will encounter every time we get up in the morning. The discovery of a risk should not lead automatically to an expensive lawsuit, the hasty banning of a product or the impeachment of a politician. Tolerable human existence depends upon the balancing of risks, not their abolition. We should not stultify our lives in the hope of making them safe. The aim of political and business leaders, of educators in every profession, should be to reinforce our sense of balance, not to hold up the empty prospect of a risk-free world."

P. Ralph Crawford, BA, DMD
Editor of the Journal
of the Canadian Dental Association



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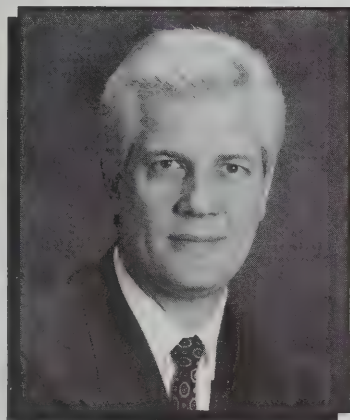
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PRESIDENT'S COLUMN

RECONSIDERING DENTAL AMALGAM



Dr. James R. Brookfield,
CDA president.

Next month, when CDA's board of governors meets in Montreal, it will be asked to approve a revised dental amalgam patient information sheet.

The revised information sheet, which was considered at length by the CDA executive council in June, incorporates several new questions and answers designed to inform the public on the safe use of dental amalgam in immunocompromised patients, pregnant women and children.

If these changes are accepted by the board in their current form, it will mark a small, but important shift in CDA's stance on dental amalgam. The information sheet will still strongly support our belief that amalgam is a safe and efficacious restorative material for all but a small minority of patients. However, it will also reflect the current scientific consensus that mercury may cross the placenta, and that total mercury from all sources may pose problems for individuals with neurological disorders or impaired kidney function.

Specifically, the information sheet will advise the public that "although there is no specific scientific evidence of ill effects which would necessitate special precautions...dentists generally take a conservative approach to treatment of the pregnant patient and may recommend, in consultation

with the patient, alternative restorative materials, other forms of treatment, or delay of treatment."

Similarly, the information sheet will inform patients that: "Dentists routinely take a number of considerations into account in selecting a restorative material, including tooth size, location and the individual's condition and medical and dental history...Alternatives may be considered for individuals who are immunologically compromised, or who suffer from a neurological condition or impaired kidney function. Although dental amalgam is not linked to such conditions, there is evidence that total body burden of mercury is of particular concern with these patients."

Some dentists will no doubt question the need for these changes, others may believe that they don't go far enough. However, they do reflect the latest Canadian thinking on dental amalgam, as expressed in the eight consensus recommendations adopted by the stakeholders committee that Health Canada assembled to review the so-called Richardson Report on "Assessment of Mercury Exposure and Risks From Dental Amalgam" and guide the department in its development of a new position statement on amalgam.

CDA was one of the stakeholders gathered around the table last February, and we fully supported both the committee's unanimous position against the Richardson Report and its policy recommendations. In fact, two of these recommendations are particularly relevant to any discussion on the proposed changes to CDA's dental amalgam patient information sheet.

Recommendation four states that: "Although there is no evidence that dental amalgams contribute to immunological, neurological or kidney disease in human populations, there is some evidence that mercury exposure from all sources is of more significance to individuals with those problems than to the general population. Dentists and physicians should be aware of these concerns in their choice of dental materials for these patients."

Similarly, recommendation five states that: "It is recommended that

a public and professional information package be prepared to make the public more capable, in collaboration with their health care providers, of making informed dental health choices."

In light of these recommendations, and our expressed support for them, we clearly have an obligation to continue to review and update our dental amalgam patient information sheet. This is what the proposed changes are all about, and I honestly believe that they are a step in the right direction.

As a responsible health care profession, dentistry must put the needs of the patient first. Although we continue to believe, based on current scientific consensus as well as Health Canada's existing policies, that dental amalgam is both a safe and an efficacious restorative material for the vast majority of patients, we have an obligation to inform patients of possible concerns. Patients must be provided with enough knowledge to make informed choices about their dental health and the types of treatment they receive. This is the reason behind the proposed revisions to CDA's dental amalgam patient information sheet.

CDA hopes that Health Canada will take an equally responsible and scientifically-based approach when it releases its new policy on dental amalgam later this year. At press time, Health Canada informed us that the policy was in the final approval stages, but the department provided no indication of when or how it will be made public.

Depending on the final wording of the Health Canada policy, CDA may consider making additional changes to our dental amalgam patient information sheet. Whatever happens, we will also continue to encourage Health Canada to undertake original research on the safety of dental amalgam and alternative restoration materials. This research should ensure that the materials we place in our patients' mouths are as safe, long lasting and effective as possible.

James R. Brookfield, DDS
President of the Canadian
Dental Association

Journal

July/
Juillet
1996
Vol. 62
No. 7

Dentists on disability shouldn't break this to pay the rent.



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Marketing the Value Of Dentistry

David Somer, DDS

Marketing, or so I'm told, is a unique process whereby the attitudes of specific segments of a population are changed in a pre-determined, desired manner through advertising, promotion and other means. When you think about it, this is pretty much what dentistry hopes to achieve with respect to the dental benefits issue. Our ultimate goal is to sell our patients — the consumer — on the value of dentistry, and on the importance of maintaining their oral health. If we can achieve this attitude shift, then our patients will continue to seek dental care, and they will continue to place high value on dental plans as a component of their employee benefits programs.

There are two keys to effective marketing. First, you have to determine where you're starting from. It's impossible to judge the success of your marketing plan unless you have a clear idea of the public's attitude toward your product at the outset. Second, based on your knowledge of the public's attitude, you have to develop a comprehensive strategic plan to shift it in the direction you want it to go.

CDA and the Ontario Dental Association have already conducted initial studies to determine the attitude of Canadian

employees to prepaid dental and other health care plans. The results are informative.

One of the key findings is that dental coverage and the patient-dentist relationship are extremely important to the majority of Canadian employees. For instance, 93 per cent of the Ontario survey respondents have a regular dentist who they visit at least once per year. The median number of visits per year is two. Also, in most cases, the employee-dentist relationship is long-standing. Eighty-nine per cent of survey respondents reported visiting the same dentist for three or more years. Almost half reported visiting the same dentist for more than 10 years.

Even more important, 91 per cent of Ontario respondents agreed with the statement, "I trust my dentist." Ninety-four per cent agreed that their dentist communicates clearly about treatment, and 84 per cent indicated that their dentist provides "value for the money."

I'm not a marketing expert by any means, but it seems pretty clear, based on the survey results, that we're starting our dental benefits issues campaign from a fairly enviable position. An exceptional opportunity exists for organized dentistry to capitalize and build on existing public atti-

tudes, namely a very strong dentist-patient relationship, and the high level of trust that our patients have in us.

By implementing communications strategies that build on these attitudes, we can cushion the impact of cost containment activities, including flex plans, preferred provider organizations (PPOs), and managed care schemes like Oralife.

CDA's dental benefits issues committee believes that the best way of communicating our "value of dentistry" message to the public is through informed dentists. Your patients trust you. If you take the time to talk to them one-on-one, and explain dentistry's position on pre-paid dental

plans, our message will definitely be heard.

The practice of dentistry demands skillful communications with our patients, both to inform them about the treatment op-



Dr. David Somer maintains a private dental practice in Hamilton, Ontario. He is a member of CDA's executive council and the chairman of the CDA steering committee on dental benefits issues.



tions available, and to gain acceptance for our preferred treatment plan. Most dentists are very competent at this — it's the key to success in the '90s.

CDA is currently developing communications tools that will help you to deliver the "value of dentistry" message to your patients. In turn, CDA and the provincial dental associations will take this message to a broader audience, by talking directly to other stakeholders, including employee groups, employers, insurance companies and plan administrators, dental benefits consultants, and brokers. We need to have a meaningful dialogue with these groups, and share information and ideas. Like us, they have a stake in the dental benefits issue, and the lines of communication must be kept open. CDA has already begun

this process, as have our corporate partners, the provincial dental associations.

Within the next few months, CDA will also create a complete new department of professional support services under a senior director. This individual, supported by dedicated staff, will be responsible for managing third-party and dental benefits issues, taxation, and CDAnet, on behalf of CDA and Canadian dentists.

It is an important step for CDA, and one that will involve a substantial outlay of your membership dues dollars. But I firmly believe that this single initiative will go a long way toward achieving our goals in the dental benefits area. It's also a reflection of CDA's commitment to preserve pre-paid dental plans for the benefit of dentists and patients alike. ■



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Insurance Claims: Statistics Emphasize the Need For Protection and Prevention

Imagine being told that, in a one-year period, your chance of suffering a serious illness or injury, battling a legal case, or experiencing office damage is one in nine. It's not only something to think about, it's reality.

During 1995, there was an average of nearly one claim for every nine dentists participating in the Canadian Dentists' Insurance Program. This statistic reinforces the important role that your insurance program plays in protecting your financial security.

The strong likelihood that you or one of your colleagues will have to make an insurance claim in any given year should be enough to send out two strong signals to all dentists. Make sure you have enough coverage in case an insurable incident occurs. And take steps to help prevent an incident from happening in the first place. Protection and prevention — that's the foundation of an effective insurance program.

Here's a quick survey of the claims statistics for some of the major plans offered by the Canadian Dentists' Insurance Program. In 1995, almost one in seven dentists participating in TripleGuard, the office plan that includes office contents, practice interruption and comprehensive general liability insurance, had a claim. The rate was slightly higher in 1994.

In the long-term disability plan, about one in 18 dentists had a claim last year. That's on the high side — the rate was one in 25 in

1994. More dollars were paid out in disability claims in 1995 than for any other type of claim in the Canadian Dentists' Insurance Program. They accounted for 57 per cent of all claims in the program for 1995.

In the malpractice insurance plan, about one in 20 dentists had a claim last year — also higher than the rate in 1994, which was about one in 23. (Statistics for this plan do not include Ontario and Quebec, as the Canadian Dentists' Insurance Program malpractice plan is not available in these provinces.)

Although comparative statistics are not available, as 1995 was their first year of operation, a couple of new plans proved to be quite popular last year. Almost 300 participants signed up for travel insurance, and about one in 30 had a claim. The legal expense insurance plan attracted 554 participants, and about one in 20 had a claim. A great many dentists across Canada saved a lot of money in legal fees thanks to this new plan.

In total, Canadian Dentists' Insurance Program participants had 1,577 claims in 1995. That represents more than \$14 million in claims dollars paid out.

Practise Claims Prevention

The plans with the most claims during 1995 were TripleGuard and long-term disability insurance. Participants in both of these plans

can take basic preventative measures to reduce their chances of a claim, however.

Most office claims in the dental profession result from water damage, fire and theft. So you should always make sure that all water outlets are turned off before you leave for the day. It's also wise to install automatic shutoff switches on your dental units to interrupt the water supply during off-hours. In addition, check your ceiling tiles periodically for stains — an indication of a possible water problem originating from a unit in an office above yours.

To reduce the possibility of extensive fire damage, keep a fire extinguisher in the office and make sure it's inspected and fully charged. It's equally important to install a good sprinkler system. For anyone choosing a practice location, avoid locating your practice in a building with residential units, or above, next to, or near a restaurant.

Every practice should be protected by top quality locks, doors and windows. A burglar alarm connected to a central monitoring station is a good idea, especially in areas that are deserted after hours. Again, if you're choosing a practice location, you may want to check with the local police department about the rate of break-ins in the area.

Reducing the risk of long-term disability claims is especially important when you consider the chances that you'll have a claim.

Almost one third of all Canadians will suffer a disability between the ages of 35 and 65 that prevents them from working for at least six months.

The most common types of disability claims during 1995 were back and other musculoskeletal problems. Preventing such claims takes a four-step approach. Assume better posture while working, which includes maintaining an upright position, and not leaning forward, whether you're sitting or standing. Never twist your body, always move your upper and lower torso in unison. Change your body position regularly, and perform back-strengthening exercises (ask your family physician for suggestions).

Accidents, heart problems and mental disorder were also high on the list of disability claims last year. Preventing accidents comes down to being careful during all physical activities. For a healthy heart, exercise regularly, don't smoke, and follow a diet that's high in fibre and low in fat.

Learning how to deal with stress can help reduce your risk of a mental or nervous disability claim. Remember, all participants in any of the Canadian Dentists' Insurance Program plans are eligible for the Members' Assistance Program, which offers confidential counselling at no cost.

There are preventative measures that can help you to avoid every type of claim, but there's

one common element. That is, prevention is a state of mind. You have to make a conscious effort to think about claims prevention in every area of your practice and personal life.

Prevention does more than potentially saving you the trouble of coping with a personal hardship or office mishap. Collectively, it may lead to lower premiums, and save money for all dentists. That's one of the many advantages of participating in a professional group plan. Members can effectively hold premium costs down by keeping claims dollars down.

So think about the claims statistics for 1995. Then think about the ways you can reduce your risk of having a claim in the future. ■

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Common Stock	17.1%	19.2%	10.3%	11.4%	10.4%	10.8%	✓ 8.9%	8.0%
Balanced	✓ 15.4%	14.2%	✓ 9.9%	9.8%	9.9%	10.1%	✓ 9.0%	8.3%
Bond & Mortgage	✓ 9.6%	8.0%	✓ 8.1%	6.9%	✓ 9.9%	9.1%	✓ 9.9%	9.3%
Money Market	✓ 6.4%	5.5%	✓ 5.5%	4.9%	✓ 6.1%	5.6%	✓ 8.1%	7.7%
International Equity	✓ 20.4%	17.1%	n/a		n/a		n/a	
European	✓ 23.2%	16.9%	n/a		n/a		n/a	
Pacific Basin	✓ 19.9%	7.9%	n/a		n/a		n/a	
Emerging Markets	7.8%	13.0%	n/a		n/a		n/a	

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historic rates based on past performance and are not necessarily indicative of future performance.

* Comparison performance figures are Globe and Mail averages for the range of similar funds offered in the marketplace before sales charges, as published in the June 20, 1996 issue.

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BOOK REVIEWS

Clinical Management of Temporomandibular Disorders and Orofacial Pain

edited by Richard A. Pertes
and Sheldon G. Gross

1995, Quintessence Publishing Co.,
Inc.; 368 pages, black & white photos
and illustrations
ISBN: 0-86715-298-2

The first 295 pages of this volume are devoted to the diagnosis and treatment of temporomandibular disorders, while the remaining 60 pages deal with other causes of orofacial pain.

There are no less than 24 contributors who, either singly or jointly, express their opinions in this book. While it may be argued that the present state of our knowledge — or ignorance — about these subjects allows for a wide variety of points of view, the result, in this case, tends toward confusion, because the reader is left with many different methods of diagnosis and modalities of treatment from which to choose. For instance, should the reader accept statements made in one chapter, which downplay the importance of occlusion in the etiology of temporomandibular disorders, when several pages in another chapter are devoted to occlusal therapy and orthodontic treatment? The multiple authorship has also given rise to much repetition of material, particularly in the areas of history-taking, examination, and some specific pain disorders. This is not to say that individual chapters are not good. In fact, many of them provide excellent reviews of the current literature.

In the preface, the authors explain that this text is necessary because "some texts [on temporomandibular disorders and orofacial pain] only reflect a clinician's particular treatment philosophy; others are too complex for the average practitioner." Although I support the notion that one clinician's treatment philosophy may be inappropriate, or even unacceptable, under some circumstances, a single authorship does, at least, give some sort of uniformity to a text, rather than a series of presentations in different styles from which the practitioner (and the dental student, for whom the book is also intended) must select. Separate chapters in this book are devoted to differ-

ent treatment modalities (e.g. occlusal appliances, pharmacotherapy, physical therapy, and surgery), and are written by different authors. This makes a logical sequence of treatment procedures difficult to find. Patients respond (or do not respond) at different phases of treatment, and it would have been helpful to have had a section devoted to all treatments, indicating their suitability, and at which stage one should move from one modality to the next.

There is a lot of very useful material in this book, it is beautifully produced, and the reproductions are excellent. In many areas, it is a very fine summary of state-of-the-art practices, but it adds little new material.

Reviewed by:

Ralph I. Brooke, B.Ch.D., LDS, Cert.
Oral Path., FDSRCS, FRCD(C)
Vice-provost, health sciences, and
dean, faculty of dentistry, University
of Western Ontario, London, Ont.

Optimal Implant Positioning and Soft Tissue Management for the Brånemark System

by Patrick Palacci

1995, Quintessence Publishing Co.,
Inc.; 83 pages, 202 color illustrations,
\$68 (US)
ISBN: 0-86715-308-3

If you place and/or restore Brånemark implants, you should read this book. As implant-assisted dentistry continues to shift toward partially edentulous patients, with an increased emphasis on esthetics, the positioning of implants and management of peri-implant tissues have become more critical. This book is succinct, well-organized and, as we have come to expect of Quintessence books, lavishly illustrated. It summarizes state-of-the-art knowledge about the biology and pathology of peri-implant soft tissues and the biomechanics influencing implant placement, with a particularly valuable chapter which beautifully illustrates a technique for papilla generation at second stage surgery.

Practitioners who work as part of a team in providing implant dentistry may wish to consider buying this book as a gift for their colleagues on the other half of the team — it will pay dividends not only for team members, but for patients as well. This short text

warrants a short review, not because it isn't worthy of additional consideration, but because it is so worthwhile that the reader is better advised to invest his or her valuable time reading the book rather than reading a review about it.

Reviewed by:

Joanne N. Walton, CD, DDS, Cert.
Pros., FRCD(C)
Assistant professor, division of prosthodontics, department of clinical dental sciences, University of British Columbia, Vancouver, B.C.

Color Atlas of Oral Pathology

by J.W. Eveson and C. Scully

1995, Mosby-Wolfe; 128 pages, color
illustrations, \$93.95 (Cdn)
ISBN: 0-8151-759-06

This book is an atlas of oral histopathology, and the illustrations are all photomicrographs. In general, these are of good quality, but no magnifications are given. The authors state in the preface that the coverage is intended to include the more common or important oral diseases, but not to be comprehensive. The projected readership includes dental undergraduate and post-graduate students, and general pathologists.

The first chapter is a 10-page review of normal anatomy and development, with some emphasis on the regional variations of the oral mucosa. Developmental defects of the teeth are described, followed by descriptions of caries and pulpitis. Wegener's granulomatosis is placed in a short section with gingival fibrous hyperplasia and chronic marginal gingivitis, making a rather odd juxtaposition of the very rare with the very common. Cysts and odontogenic tumors are also well described.

In the chapter on "Bone," osteomyelitis, fibrous dysplasia, ossifying fibroma, cherubism, giant cell granuloma, hyperparathyroidism, Paget's disease, osteoma, osteosarcoma, chondroma, chondrosarcoma and eosinophilic granuloma are described together with pulse granuloma and actinomycosis, which fit somewhat awkwardly. Granulomatous lesions include sarcoid, tuberculosis and oral Crohn's disease. Under "Stomatitis," the conditions listed include median rhomboid glossitis, herpes

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simplex — but not zoster — pemphigus, lichen planus, lupus erythematosus, pemphigoid, erythema multiforme, erythema migrans and Behcet's syndrome.

The chapter on "White Patches" includes white sponge naevus, frictional keratosis, thrush, oral submucous fibrosis and hairy leukoplakia. "Pigmented Lesions" covers melanotic macules, naevi, melanoma, the pigmented neurectodermal tumor of infancy, and amalgam tattoos. Under "Soft Tissue Swellings," inflammatory polyps, peripheral giant cell granulomas and several benign tumors are described with fibrosarcomas and rhabdomyosarcoma.

Haemangioma and lymphangioma are described in the chapter on blood vessel abnormalities, along with giant cell (cranial) arteritis, radiation damage, Kaposi's sarcoma and eosinophilic ulcers. Under "Squamous Epithelial Tumors," papillomas, squamous cell and verrucous carcinomas are described together with epithelial dysplasia. The relatively long chapter on salivary diseases includes sialadenitis, sialosis, mucocoele, Sjogren's syndrome and necrotising sialometaplasia together with a comprehensive list of benign and malignant tumors. The final chapter on "Lymphoreticular Diseases" includes cat-scratch disease, the lymphomas, myeloma and amyloidosis.

This abbreviated account of the abnormalities covered in this book serves as a reminder of the extensive variety of diseases of the mouth and maxillo-facial region with which dentists must be familiar prior to graduation.

The authors state that they will not discuss the more theoretical and controversial aspects of the subject, but the text, brief as it is, is clearly written and provides a wealth of information on the conditions described. This is a well-written and illustrated book that succeeds in fulfilling its authors' intentions.

Reviewed by:

J.H.P. Main, BDS, PhD, FDSRCS, FRC(Path.), FRCD(C)
Professor and head, department of oral pathology, faculty of dentistry, University of Toronto, Toronto, Ont.



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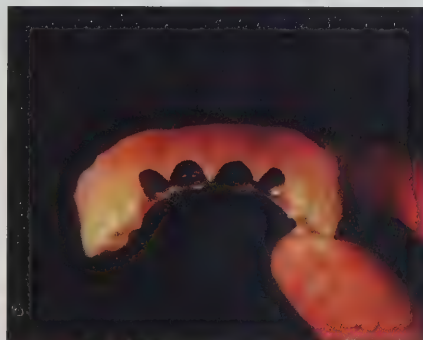
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NEWS UPDATE

CDA Considers Revised Dental Amalgam Patient Information Sheet

CDA's board of governors will be asked to approve a revised dental amalgam patient information sheet when it meets in Montreal August 16-17.

Planned changes to the information sheet, which won the support of CDA's executive council in June, include the addition of a new question and answer on the need for dentists to take special precautions with children and pregnant women, as well as new information on the safe use of dental amalgam in individuals who are immunocompromised, or suffer from impaired kidney function.

"Although the scientific consensus is still strongly in support of amalgam, patients should be advised of possible concerns and provided with balanced information to help them make informed choices about their oral health," said Brian Henderson, CDA's associate executive director. "That's what this new document is all about. It's a shift from where we were, but I think it will ultimately be beneficial to both dentists and patients."

If it is ultimately approved by the CDA board, the revised information sheet will state that: "Although there is no specific evidence of ill effects which would necessitate special precautions (with children and pregnant women), mercury is known to cross the placenta and special consideration may be given to the needs and concerns of the pregnant patient. In many instances, amalgam presents the best possible option for restorative treatment. However, dentists generally take a conservative approach to treatment of the pregnant patient and may recommend, in consultation with the patient, alternative restorative materials, other forms of treatment or delay of treatment. Dentists may also give special consideration to the restorative treatment needs of children and to concerns of parents. Most children currently have very few cavities (and consequently less exposure to mercury) and dental amalgam offers distinct advantages in the restorative treatment of young patients, particularly with primary (baby) teeth. For example, composite restorative materials do not adhere to the enamel of primary teeth as well as the enamel of permanent teeth. However, alternative materials should be considered

CDAnet Reaches New Partnership Agreement With Dentaide

CDA and the Quebec Dental Surgeons Association (QDSA) have reached agreement on a reciprocity agreement that will allow dentists in Quebec to submit claims electronically on the CDAnet system.

The agreement creates a truly national electronic interchange data network for dental claims in Canada, which will be known as Le réseau ACDQ/CDAnet in Quebec, but maintain the CDAnet name in the rest of the country.

Dentists will now be able to access three telecommunications networks — Dentaide, ACE and SHNS (Shared Health Network Services) — through the Réseau ACDQ/CDAnet (in Quebec) or CDAnet (in the rest of Canada). ■



CDA president Dr. James Brookfield and QDSA president Dr. Daniel Pelland shook hands on the launch of the Réseau ACDQ/CDAnet network during Quebec's annual dental convention, *Les Journées Dentaires*, last May.

when suitable, and recommended as indicated."

An in-depth story on the proposed revisions to CDA's dental amalgam patient information sheet was published in the May-June issue of *Communiqué*. CDA has also made a preliminary draft copy of the document available to Health Canada, which is expected to release a new policy statement on dental amalgam later this year.

The complete text of the revised patient information sheet, as approved by the board of governors, will be published in the September-October issue of *Communiqué*. ■

Dr. Ernest Charron Memorial Fund Established

A memorial fund has been established at the University of Montreal to support research, continuing education for academic staff, and promote the faculty of dentistry.

The Dr. Ernest Charron Memorial Fund, which was created with a \$500,000 capital donation from Dr. Charron's family, will also award scholarships to undergraduate and graduate dental students pursuing a degree related to the study of dentistry.

Dr. Charron graduated from the University of Montreal's faculty of den-

tistry in 1912, and undertook graduate training in dental surgery and anesthesiology in Philadelphia, Chicago, New York and Boston. In 1915, he joined the staff at the University of Montreal as a clinician. Ten years later, in 1925, he was appointed professor of dental surgery and anesthesiology. He held this post until 1944.

From 1944 until his retirement in 1957, Dr. Charron was dean of the faculty of dentistry. He also became involved in organized dentistry, and served a term as the president of the College of Dental Surgeons of Quebec and the president of the International College of Dentists in 1952.

Dr. Charron was awarded honorary membership in CDA in 1953. ■

Dental Assistants Consider National Examination

A group of stakeholders formed to address the "fundamental issues regarding the establishment of a universal dental assisting examining strategy in Canada" has concluded that a national dental assisting examining body is needed, similar to the National Dental Examining Board.

Brought together by the Canadian Dental Assistants' Association (CDAA) January 26-27, 1996, the stakeholders group included regis-

trars, provincial representatives and the Commission on Dental Accreditation of Canada.

It reached consensus on several points: there is a need for a universal examination strategy for entry level dental assistants; a national dental assistant examining body will be established independent of the CDAA; the board will be named the National Dental Assisting Examining Board (NDAEB); all dental assisting regulatory bodies in Canada will be encouraged to incorporate a universal examination strategy and recognize the NDAEB certificate; the NDAEB will begin functioning on January 1, 1998; practical/clinical evaluations will be evaluated at the discretion of the provincial regulatory bodies; core skills will parallel those skills approved by the CDA Council on Education in June 1990; requirements for grand-parenting of the NDAEB certificate will be considered; and the organizational group will meet again in Montreal in August during the CDA Convention. ■

Quebec Dental Surgeons Association Celebrates 30th Anniversary

The Quebec Dental Surgeons Association (QDSA) celebrated its 30th anniversary last month.

Founded as the Association professionnelle des chirurgiens dentistes du Québec on June 6, 1966, QDSA officially adopted its current name, the Association des chirurgiens dentistes du Québec, on January 17, 1970.

Eight presidents have presided over its 30 year history: Dr. Bertrand Lemieux 1966-1967; Dr. Jean-Claude Durand 1967-1968; Dr. Henri Hamel 1968; Dr. Hubert La Belle 1969-1973; Dr. Pierre-Yves Lamarche 1973-1974; Dr. Pierre-Paul Prud'Homme 1974-1975; Dr. Claude Chicoine 1975-1993, and Dr. Daniel Pelland from 1993 to the present.

Among its many accomplishments, the QDSA takes credit for launching Quebec's first annual convention, Les Journées Dentaire, in 1971. Responsibility for the event, now one of the most important dental conventions in Canada, was given to the Ordre des Dentists du Québec in 1975.

Other accomplishments include the establishment of the Quebec Professionals' Fund in 1978, Sogedent Assurances Inc. in 1980, and Dentaide in 1983. More recently, a reciprocity agreement was negotiated between CDA and QDSA to unite the CDAnet and Dentaide networks. The new network, which will operate exclusively in Quebec, has been named Le réseau ACDQ/CDAnet. ■

Dental Health Month Celebrated Across Canada

Kamloops, B.C., joined thousands of communities across Canada when it celebrated Dental Health Month this April.

The highlight of the campaign to promote optimal oral health care in Kamloops was a proclamation from the mayor's office declaring April 1996 as Dental Health Month.

But the city's Dental Health Month activities, which revolved around the theme "Keep the magic in your smile", also included guest appearances by dental professionals at sporting events, an Easter egg hunt and a fun-run where a toothbrush and tooth paste were given to all participants.

In Ottawa, a full day was given over to Dental Health Month activities. During the event, held April 20, 136 dental volunteers set up displays and demonstrations in five of Ottawa's busiest shopping malls. The intraoral camera demonstration was a particular hit with the thousands of children and their parents who packed the stores. There was also considerable interest in the 13 table clinics presented by dental hygiene students from the city's Algonquin College. ■



One of 13 table clinics presented during Ottawa's Dental Health Day.

Award of Excellence Awarded to Montreal Dentist

Dr. Harry Rosen of Montreal has been presented with the Academy of Operative Dentistry's Award of Excellence.

The award was bestowed on Dr. Rosen during the academy's 25th anniversary annual meeting, which was held in Chicago, February 23, 1996.

Established by the Academy in 1986, the Award of Excellence recognizes outstanding contributions to the discipline of operative dentistry.

Dr. Rosen maintains a private practice in restorative dentistry in Montreal, and for the last 41 years has taught in the faculty of dentistry at McGill University. He received his dental degree from McGill in 1953, and is currently director of graduate prosthodontics.

In addition to the Award of Excellence, Dr. Rosen is also the recipient of the Canadian Faculties of Dentistry's W.W. Wood Award for Excellence in Dental Education and the Canadian Dental Association's Distinguished Service Award. ■

CDA's Executive Director Honored

The executive director of CDA, Mr. Jardine Neilson, has been selected for honorary fellowship in the Pierre Fauchard Academy.

Honorary fellowship in the academy is bestowed on individuals who have made valuable contributions to the art and science of dentistry. Mr. Neilson will be presented with the distinction September 28, during the annual session of the American Dental Association. ■

OBITUARIES

Betts, Dr. Robert L.: Dr. Betts received his dental degree in 1941 from the University of Maryland in Baltimore. He died February 12, 1996.

Boisvert, Dr. Paul H.: Dr. Boisvert of Sherbrooke, Quebec, died April 16, 1996, at the age of 85. He was a 1940 graduate from the University of Montreal's faculty of dentistry.

Bruni, Dr. Arthur C.: Dr. Bruni of Sault Ste-Marie died January 20. He graduated from the University of

First Woman Elected President Of Ontario Dental Association

The Ontario Dental Association (ODA) broke with 129 years of history in May, when it elected its first-ever female president.

Dr. Elizabeth MacSween of Ottawa was installed as president of ODA in Toronto, during the association's annual meeting May 10-11. She will be joined on ODA's management team by Dr. Jack Cottrell of Port Perry, the new president elect, and by Dr. Wayne Pulver, an endodontist from Willowdale, who was elected vice-president.

In accepting the leadership of the 5,000-member organization, Dr. MacSween hopes to become a role model for other women in dentistry.

"I am hopeful that my election will open doors for many other women. It is symbolic of the overwhelming number of women who are joining the profession," she said.

Dr. MacSween, who maintains a general dentistry practice in Orleans, Ontario, graduated from the University of Toronto's faculty of pharmacy in 1976. She

then entered the dental faculty, earning her DDS in 1980.

Active in organized dentistry for the past 14 years, Dr. MacSween has participated in numerous professional associations, as well as on committees of the Ottawa Dental Society, the ODA and the CDA. She served as president of the University of Toronto's dental alumni association from 1993-1995, and was appointed to a working group of the Ontario Ministry of Health's advisory council on domestic market opportunities in 1993. ■



Dr. Elizabeth MacSween

Toronto's faculty of dentistry in 1958, and retired from practice in 1991.

Cameron, Dr. R. Bruce: Dr. Cameron died in Victoria, B.C., April 21, 1996. Born in Toronto in 1919, he was raised in Swift Current, Sask. Dentistry came naturally. Dr. Cameron's father, Dr. G.L. Cameron, was a prominent dentist and served as president of CDA in 1936-38. Dr. Cameron received his dental degree from the University of Toronto in 1941. After serving in the armed services during the Second World War, he began practising dentistry in Edmonton. He also taught part-time at the University of Alberta until 1969, when he moved to Victoria. Dr. Cameron was a life member of the CDA.

Debrett, Dr. Edward Graham (Ted): Dr. Ted Debrett passed away March 31, 1996. Born in Winnipeg in 1934, he received his dental degree from the University of Toronto in 1960. Dr. Debrett restricted his dental practice to children's dentistry throughout most of his career, and for over 30 years was a part-time faculty member in the University of Manitoba, faculty of dentistry, pedodontic department. Intensely interested in dental association affairs, he served as president of the Winnipeg Dental Society in 1968, the Manitoba Dental Association in 1975 and the Western Canada Dental Society in 1983-85. In 1994 Dr. Debrett was awarded an honorary life membership by the Western Canada Dental Society. He was inducted as a member of the International College of Dentists in 1982.

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Fainstein, Dr. Arnold D.: A 1957 graduate from Loyola University, Dr. Fainstein practised dentistry in Winnipeg, Manitoba, until his retirement in 1991. He died in 1995.

Harper, Dr. Bradley D.: A 1977 graduate from the University of Toronto's faculty of dentistry, Dr. Harper practised dentistry in Little Current, Ontario. He died April 3, 1996. To honor his memory, donations to benefit his children can be sent to: Dr. Bradley Harper Children's Trust Fund, c/o Janisse Bros. Funeral Homes, Attn.: Paul Janisse, 1139 Ouellette Ave., Windsor, Ont. N9A 4K1.

Leyland, Dr. Hal Everett: Dr. Hal Leyland died in Nassau, the Bahamas, April 4, 1996. He was 77. A 1943 graduate of the faculty of dentistry, University of Toronto, Dr. Leyland spent four years with the armed services. He practised in Canada until 1954, when he moved to Florida to serve as full-time director of the Florida Dental Association. In 1961 he moved to Nassau, the Bahamas, where he established a general dental practice. Never forgetting his Canadian roots, Dr. Leyland maintained a close alliance with the Canadian dental scene, and was a life member of the Canadian Dental Association. He was co-founder and past-president of the Bahamas Dental Association, and for many years was national treasurer for the FDI. He was also a member of the American College of Dentists, the Academy of Dentists International and the Pierre Fauchard Society.

McCabe, Dr. James R.: A 1981 graduate from the University of Western Ontario, Dr. McCabe of Samia, Ontario, died April 28 following a car accident. He was 45.

McNichol, Dr. Chalmers T: Dr. McNichol died May 13, 1996. He was 72. The son of a pioneer Alberta dentist, he graduated from the University of Alberta in 1949. Dr. McNichol practised in Calgary throughout his career, and served as a long-time member of the council of dental services of the Alberta Dental Association and of the CDA council on health care, where he was instrumental in formulating a protocol of procedure codes and services that are still used in the profession and insurance industry today. He was a life member of the CDA.

Tse, Dr. Paul P.: Dr. Tse graduated from the University of Toronto's faculty of dentistry in 1975. He died in February at the age of 47, and was practising in North York, Ont., at the time of his death.

WHAT'S IT?

This month's "What's It?" was provided by Dr. Melanie Wood of Winnipeg. If you know how these very finely-shaped Asko Diagnostic Wires were used, please write to Dr. P. Ralph Crawford, Editor, Canadian Dental Association, 1815 Alta Vista Drive, Ottawa ON K1G 3Y6. ■



LIBRARY PACKAGE

The Library Package — or Search of the Month — for July is **ENDODONTICALLY TREATED TEETH**. This package is available to CDA members for \$5, plus applicable taxes.

New Acquisitions

Hardie, J. and Edwin, M. *AIDS, dentistry and the illusion of infection control*, 1995.

Jones, N.L. and Igaku-Shoin *Atlas of forensic pathology*, 1996.

Rosenberg, Mel *Bad breath* [book and video] Ramot Publishing, 1995.

Cecil's essentials of medicine. Saunders, 1993.

Scully, C. and Welbury, R. *Color atlas of oral diseases in children and adolescents*. Wolfe, 1994.

Grundy, J.R. and Jones, J.G. *Color atlas of operative dentistry crowns & bridges*. [2nd ed.] Wolfe, 1992.

Schoen, D.H. and Dean, M-C. *Contemporary periodontal instrumentation*. Saunders, 1996.

Hupp, J.R. et al. *The 5 minute clinical consult for dental professionals*. Williams & Wilkins, 1996.

de Jong, R.H. *Local anesthetics*. Mosby, 1994.

Fedi, P.F. and Vernino, A.R. *Periodontic syllabus*. Williams & Wilkins, 1995.

Cottone, J.A. *Practical infection control in dentistry*. Williams & Wilkins, 1996.

Finkbeiner, B.L. *Practice Management*. Mosby, 1996.

Thomas, K.F. *Prosthetic rehabilitation*. Quintessence, 1994.

Schmidt's anatomy of a successful dental practice. Pennwell, 1996.

CDA members can borrow these texts for one month at a cost of \$5 each, plus applicable taxes.

To order the Search of the Month, or to borrow a book or video, please contact the CDA library at: 1-800-267-6354 (ext. 223), or fax at: (613) 523-6574;
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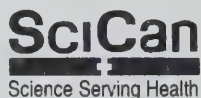
SELF-LEARNING SELF-ASSESSMENT

Since last September, the SLSA Program has been published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by a quiz of 15 questions. The Quiz for the 1995-96 SLSA Program was published in the June issue of the *Journal*.

All 10 provincial licensing authorities in Canada recognize the SLSA Program for continuing education credits. In order to receive these credits, dentists must complete and return the Quiz response card to the Canadian Dental Association by August 10, 1996. The names of those dentists who return the completed quiz response cards will be forwarded to their respective licensing authorities for consideration.

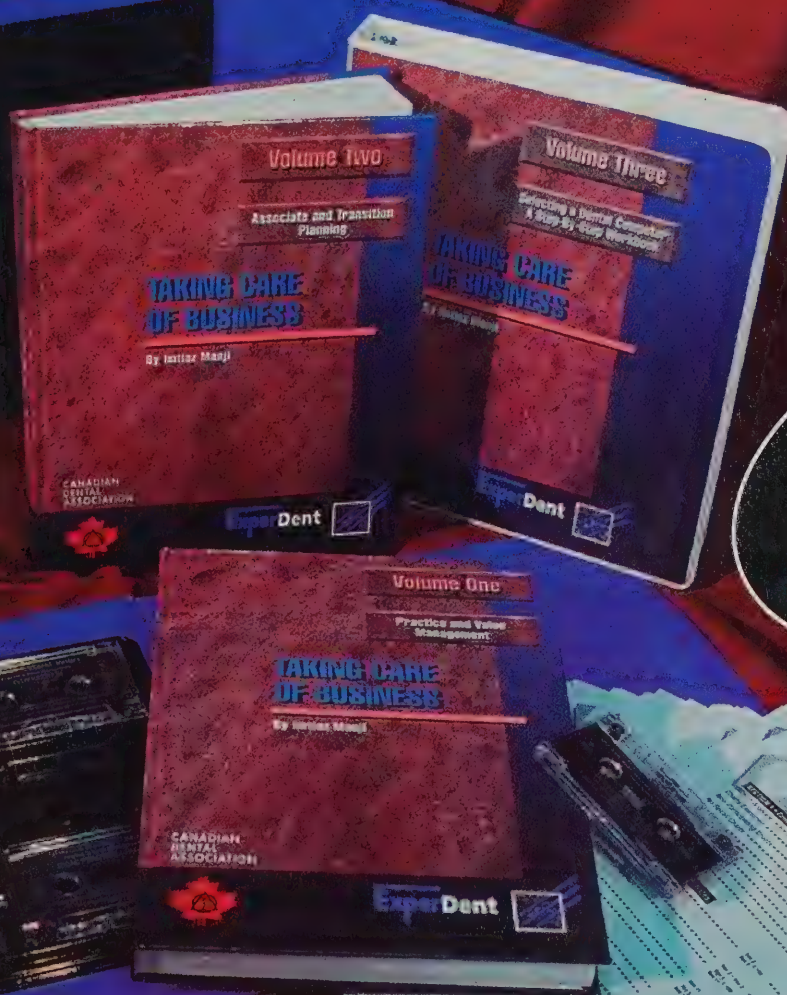
Answers to the Quiz will be published in the August 1996 issue of the *Journal*. Quiz results will not be provided by either CDA or SLSA.

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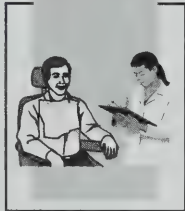
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DENTAL ETHICS



Confidentiality At Risk

Richard D. Speers, DDS

The confidentiality of medical information has been an essential element in the delivery of health care from the dawn of medicine.

Hippocrates addressed the confidentiality issue in the fourth century BC. Today, it remains clearly articulated in the Regulated Health Professions Act (Ontario).

The Act is very specific on the need for confidentiality in dentistry: "It is professional misconduct to release confidential information unless requested by the patient or required by law."

It is clearly impossible to practice safe and effective medicine or dentistry without obtaining a complete and accurate patient history at the outset of treatment. Dentists must be aware of possible allergic reactions to drugs or restorative materials, as well as the patient's general health status. Information of this nature is regularly entrusted to health care providers with the understanding that it is, and will remain, "confidential."

The Ontario College of Physicians and Surgeons summarized the concept of confidentiality rather eloquently in its presentation to the 1980 Krever Report of the Commission of Inquiry into the Confidentiality of Health Information: "The doctor is entrusted with information of the most intimate and personal nature. The patient is willing to accept such an examination or inquiry in a relationship of confidence and trust to obtain the benefit of the physician's advice and treatment. It is unlikely, however, that anyone would disclose intimate details ... if there was reason to believe the information would not be kept secret."¹

In 1992, the Supreme Court of Canada ruled on the right of a patient to access his or her medical records. In the case of *McInerney v. MacDonald*, the court found that "the patient is entitled, upon request, to inspect and copy all information in the patient's medical file ... the onus is on the physician to justify a denial of access."²

This judgment is particularly sound given today's portable society, in which patients may be exposed to any number of health care providers. In effect, it enables patients to seek safe, continuous care from a provider of their choice. However, the patient may still be at risk, because there are still no clearly defined rights to privacy or acceptable limitations on the rights of non-medical third parties to access confidential medical and dental information.

In its presentation to Krever, the Ontario Medical Association stated that: "Traditionally, medical records contained the physician's candid comments about the patient and his (her) condition. These comments assisted the physician in recalling months or years later the patient's physical and mental state ... Statements made by a patient in distress may be inaccurate, totally erroneous, and highly inflammatory, and should remain as private communication between patient and physician."¹

Unfortunately, the widespread use of blanket consent forms has allowed third-party agencies, such as insurance companies, to access complete medical files — including any candid observations, records of conversations and clinical notes. There is currently no legal limitation on the scope of informa-

tion available to these agencies once consent is obtained. In effect, with a signed "consent" form, they can request and obtain a photocopy of the patient's entire chart.

Dr. T.P. Morley, formerly a professor and the chair of neurosurgery at the University of Toronto, summed up the problem in his presentation to Krever: "In disability insurance cases, the signed authorization allows photocopying and unlimited dissemination by the insurance company. Furthermore, the patient has no idea whatsoever what is in his (her) hospital records. I have had to advise the patient not to allow his (her) hospital record to be copied for an insurance company because of the disclosure of entirely personal secrets irrelevant to the company's requirement."¹

The concept of privacy was also addressed in the case of *Halls v. Mitchell*. In his judgment, Mr. Justice Duff stated: "... It is important that patients, in consulting a physician, shall feel that they may disclose facts touching their bodily health, without fear that their confidence may be abused to their disadvantage."³

In recent years, there has also been a subtle shift that has seen government agencies seek, and obtain, greater access to health care records. This is wrong. The simple fact that provincial governments pay most of the medical costs incurred by Canadians does not give elected officials the right to access identifiable health records — all they're doing is spending the tax payers' hard-earned money.

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Unfortunately, if the actions of former Nova Scotia Health Minister David Nantes, who was convicted of wrong doing for releasing the confidential psychiatric records of a bureaucrat, and former Ontario Health Minister Evelyn Gigantes, who released the identity of a patient receiving health care, are anything to go by, far too much information is available to elected officials already. Patients receiving health care benefits through provincial programs need assurances that these types of indiscretions won't be repeated.

This isn't likely to happen, however. Government is clearly seeking increased access to confidential patient information, not less. In Ontario, as it was originally crafted, Bill 100 (the so-called Omnibus Bill) would have given the minister of health unlimited access to any patient record, and the right to release this information with legal impunity. A ground swell of public opposition, supported by the provincial privacy commissioner, ultimately led to public hearings, and to changes in the final wording of the bill.

Similarly, either by design or neglect, at least two federal agencies have enacted programs that allow government auditors to examine confidential medical information. The audit mechanisms for the Goods and Services Tax (GST) give Revenue Canada auditors the right to access individual patient charts to determine if the procedures provided by the dentist were taxable. Currently, procedures provided for strictly cosmetic reasons are subject to the GST, while procedures that are non-cosmetic in nature are exempt.

Despite the concerns expressed by this author and others with regard to patient confidentiality, the Federal Privacy Commission has confirmed that Revenue Canada can legally inspect patient charts. Mr. Brian Foran of the commission has stated that the auditors will "exercise care," but the fact that Revenue Canada has been given unrestricted access to identifiable patient records continues to be worrisome.

In a more recent move, Medical Services Branch (MSB) informed Ontario dentists that Liberty Health, the national administrator of Health Canada's Non-Insured

Health Benefits (NIHB) dental program, was "authorized to review all data and documentation relating to claims submitted on behalf of clients covered under the NIHB program."

CDA has asked MSB to review this policy, and to practise more conventional audit mechanisms that respect patient privacy. The association recognizes that MSB, as the provider of a third-party dental benefits program, may conduct independent audits of participating dentists. But while this may give MSB the right to use profiling and other means to confirm the validity of submitted claims, it does not allow them full access to patient records, or to conduct a complete on-site review of a practitioner's files.

As CDA's director of corporate services, Sandra Davis, stated in a *Communiqué Special Bulletin* last month, "If plan providers were allowed complete access to medical and dental records, it would put the whole principle of patient confidentiality in jeopardy. Furthermore, in-office audits by plan providers, such as MSB, are illegal in some provinces and require patient authorization in others. Dentists who allow MSB or their representatives to conduct in-office audits may be breaking the law."

From the perspective of the health care provider, the confidentiality issue has broader implications. If appropriate legislation is not forthcoming to protect the confidentiality of patient information, it will likely become much more difficult to secure accurate and complete information from patients.

In the words of a now deceased Chicago mobster: "Three people can keep a secret ... providing two are dead."

Patients with infectious diseases such as HIV and HBV could choose to keep their condition to themselves if they perceive that government and private agencies — particularly banks and insurance companies — have ready access to their confidential medical and dental records. Yet physicians and dentists need this type of information to provide these patients with optimum care and treatment.

There is also growing concern about the potential for unauthorized individuals to gain access to

government and private data bases using the so-called information highway.

In March of this year, the Canadian Standards Association (CSA) took action on the privacy issue by announcing the acceptance of a national privacy standard. The cornerstone of this voluntary endeavor, the 10-point Privacy Code, was crafted by representatives of both business and government. Unfortunately, the major participants were all organizations which are intent on collecting and sharing personal data. No input was obtained from organizations or individuals charged with the task of protecting confidential patient information, such as hospitals, health care associations, licensing bodies, and providers.

Although public concern over the confidentiality of personal information was a factor in CSA's development of a national privacy code, much of the impetus for this endeavor came from international trade issues. The European Community (EC) could not trade personal data with Canada because our country had not established appropriate safeguards to protect this type of data. EC member countries (as well as Australia and New Zealand) have all enacted legislation to protect personal data, which prevents it from being transmitted to jurisdictions that lack appropriate protection.

Industry Minister John Manley recently announced that legislation to define the information highway would be tabled as early as this fall. Presumably, this will establish a formally legislated code to protect personal information.

Given the broad and impressive credentials of the CSA privacy committee, its code will likely form the framework for the anticipated federal legislation. But unless it is implemented properly, the CSA code will actually do very little to protect health information. In its "Principles in Summary" section, under the title "Limiting Collection," the CSA code states: "The collection of personal information shall be limited to that which is necessary for the purposes identified by the organization. Information shall be collected by fair and lawful means."⁴

Under this broad-based guideline, virtually no patient information will be unavailable to an insurer, a financial institution selling insurance, or a third party armed with a broad-based consent. It will therefore become incumbent on the medical and dental professions to temper this clause, and force third parties to reconsider the scope of information requested. Certainly, it should not become common practice for third parties to routinely demand and receive full access to patient charts.

The CSA code tends to treat all "personal" information in a similar fashion, but it must recognize that medical information differs significantly from financial data and other personal information related to basic business transactions, such as buying a magazine subscription or applying for a bank loan. Most medical data is secured from health care providers. In nearly all cases, it was originally collected from patients on the basis that it was personal information which would only be used to assist the provider in rendering treatment for an ailment. There was never any question of this data being stored in data banks, sold, or used to deny benefits of some kind.

Given the staggering amount of information available today, and ease with which it can ultimately be retrieved and transmitted, limitations should be considered before any further access to medical records is allowed.

Government agencies must recognize this concern. Current policies that allow bureaucrats full access to patient charts solely for the administration of tax laws should be immediately revised. The potential gain to be had from an audit of GST compliance does not justify the incursion into patient privacy. Clear limits should be set on the scope of future income tax audits involving health care personnel, so that identifiable patient records are fully protected.

The government agencies which provide health benefits (MSB, etc.) must recognize that provincial bodies are already in place to review the conduct of professionals and the standard of care. Each provincial licensing authority is mandated to investi-

gate the conduct of its members with respect to the legitimate provision of professional services. These agencies are equipped and mandated to investigate clinical records. The need for full chart access to "audit" an insurance or third party plan is completely unnecessary and abusive.

If privacy is of any value, access to medical information should be restricted to specific agencies, as defined under the appropriate act (e.g. the Bank Act, the Insurance Act, etc.) or under umbrella privacy legislation. Furthermore, a clear articulation of what is and isn't "necessary" information should be filed and approved under the appropriate act. Records of treatment, diagnoses and reports are presently available and should remain so. But full chart copying and dissemination is unacceptable. Broad-based consent essentially strips patients of privacy by laying irrelevant and private observations open to scrutiny.

The CSA code also deals with consent. Its "Principles in Summary" state: "The knowledge and consent of the individual are required for the collection, use, or disclosure of personal information."

In short, for consent to be legal, it must be informed. If an agency requires access to patient charts, it should provide its clients with a document that clearly outlines the information being sought, a copy of the report submitted on their behalf, and the right to withdraw consent if so desired. Clearly, a failure to provide consent could result in a loss of eligibility for coverage or benefits, but the patient, or client, must have the right to make that choice.

Unless patients are confident that the sensitive personal information they divulge to their health care providers is protected in every sense of the word, it stands to reason that this information will be withheld or provided selectively by "informed" individuals. This would be to the mutual disadvantage of dentists, physicians and patients. The primary reason for collecting health information from patients is to ensure that they receive proper and timely treatment. If this primary purpose is compromised, by seeking documentation

for secondary purposes that are unrelated to patient care, it leads to the ultimate ethical question of who dentists and physicians are protecting.

Given the fact that patient care can be compromised by third-party access to records, it would not be outrageous to expect the various provincial licensing bodies, which are charged with protecting the public, to take appropriate action. Traditionally, these bodies have protected patients from practitioners, not third-party agencies. But it is unlikely that any other bodies or organizations are so well placed to articulate the need to protect the privileged dentist-patient relationship, or the patients' interests.

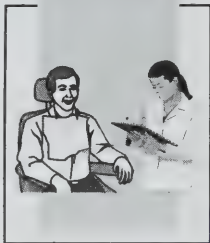
Dentistry's regulatory bodies could play an important role by consulting with both government and private agencies on the privacy issue. In the past, organizations such as CDA and the provincial licensing authorities have approached legislators as patient advocates. This is not inconsistent with the defined mission statements of these groups. For example, CDA and the 10 provincial dental associations were instrumental in lobbying for the inclusion of fluoride in municipal drinking water supplies. This has proven to be one of the most cost effective public health measures this country has seen. An historical precedent is certainly in place to justify the role of dental and medical associations in the promotion of good health and patient protection. ■

Dr. Speers maintains a private practice in Toronto and is a member of the CSA Privacy Implementation Committee, and a past chairman of the Practice Advisory Committee of the ODA.

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DENTAL ETHICS



Dentists At Risk: The Ontario Experience

Robert A. Brandon, DDS

Brian G. Waters, DDS

By its very nature, the dental profession exposes its members to a significant amount of stress. Dentists have to deal with the pressures of running a dental practice, maintaining standards of care, attracting new patients, trying to sustain their practice, and treating difficult patients all at the same time.¹

Many dentists and dental auxiliaries clearly need help to cope. The suicide rate of dentists is two times higher than that of the general population, and the incidence of divorce, chemical dependency, and cardiovascular disease is also significantly higher.

Twelve years ago, in response to the problem of stress in the profession, the Ontario Dental Association (ODA) established its Dentists At Risk Program. Since then, hundreds of dentists have received confidential help from members of the program's dentists at risk committee.

The first dental collegial assistance program in Canada was established in 1983 by Dr. Chris Christianson, in conjunction with the British Columbia College of Dental Surgeons. One year later, in 1984, three Ontario dentists — Dr. Jim Golem, Dr. Jeff Boulton and Dr. Bill Glave — established ODA's Dentists At Risk (DAR) program. Both initiatives were successful from the start, and several other provincial programs have subsequently begun across the country.

ODA's dentists at risk committee was formed on the assumption

that dentists in distress would initially feel more comfortable, and more willing to speak out, if they could talk directly to another dentist about their confidential concerns. Today, 10 years later, it's clear that this approach is effective, as committee members regularly facilitate quick, effective assistance for their colleagues in distress.

Sometimes, just being able to place the initial call provides immediate relief to concerned dentists. The key, as can be seen in the words of these callers, is having someone to talk to: "I thought that I was the only one who felt this way," "I felt like such a failure," "it's wonderful now not to feel so alone."

To date, the Ontario program has received over 1,000 calls for assistance. Absolute confidentiality is essential. "Dentistry is terribly demanding, and we don't leave our wounded lying on the battlefield," says DAR founding member, Dr. Jim Golem.

Because stress in dentistry isn't restricted to dentists alone, the Ontario committee also includes a dental assistant and a hygienist.

Studies have indicated that one of the greatest stresses for dentists and their staff occurs when a patient is dissatisfied with his or her treatment, closely followed by having to treat an uncooperative patient.² Other major stresses in dental practice include: running behind schedule, heavy financial obligations, and treating anxious patients.

Many of these stresses are, to some degree, out of the dentist's control. What remains firmly within the dentist's control, however, is his or her reaction to these stresses. The degree to which a dentist responds unfavorably to any given situation is a matter of personal choice. And by choosing how to react, the dentist can largely determine what impact, if any, the stressful situation will have on his or her practice and health.

The best approach is to accept that some stressful situations are inevitable in dental practice, and learn how to deal with them in a healthy, effective way. Dentists may also choose to seek professional counselling for help with their distress.

Another very good way of dealing with stress is to use it as a motivator and exploit it to your own advantage. This is easier said than done, however, and dentists may require initial assistance in the form of courses, workshops and counselling.

Many dental professionals are already using the stress in their lives to be more productive. They've realized that stress is a part of everyone's life, and that we all have the choice of dealing with it constructively or otherwise. However, many people are still unwilling to admit that stress is a problem until it is too late.

Every day, dentists are exposed to a higher level of stress than average individuals. This should alert us, as professionals, and as a pro-



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(506) 536-2229

Quebec

(514) 463-9100

Ontario

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Dr. B. Waters: (416) 597-0494

Manitoba

(204) 453-0055

Saskatchewan

(306) 352-0680

Alberta

1-800-226-6433;
Edmonton: (403) 453-1873;
Calgary: (403) 265-2454

British Columbia

(604) 737-0062

fession, to be proactive in dealing with stress.

All too often we deny the ravages of stress in our profession: the terrible chest pain, terror and sweating caused by a stress-induced heart attack; the intractable sorrow and pain of the family left behind after a dentist commits suicide; or the total loss of enjoyment of life, family, and practice experience by someone trapped in professional burnout syndrome.

These types of tragedies are both unfortunate and avoidable. There are countless resources available to help health professionals deal with stress, beginning with collegial assistance programs — like Dentists At Risk — that can direct you to people who are knowledgeable about the specific stresses that you experience in dentistry.

We urge dentists to recognize that they may be under consider-

able stress, especially in today's environment. Nobody is immune to the serious consequences of untreated stress and professional burnout. Take effective action through self education, counselling, lifestyle adjustment, and the use of collegial assistance programs to set yourself in the right direction. ■

Dr. Robert A. Brandon is past-president of the ODA Dentist at Risk Committee and the 1992 recipient of the Canada Volunteer Award Certificate of Merit. He currently is a council member of the Royal College of Dental Surgeons of Ontario.

Dr. Brian G. Waters is the chairman of the ODA Dentists at Risk Committee. He is editor of the *Dentaletter*, conducts a private dental anesthesia practice in Toronto, and has a part-time appointment in the faculty of dentistry, University of Toronto.

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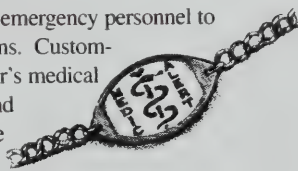
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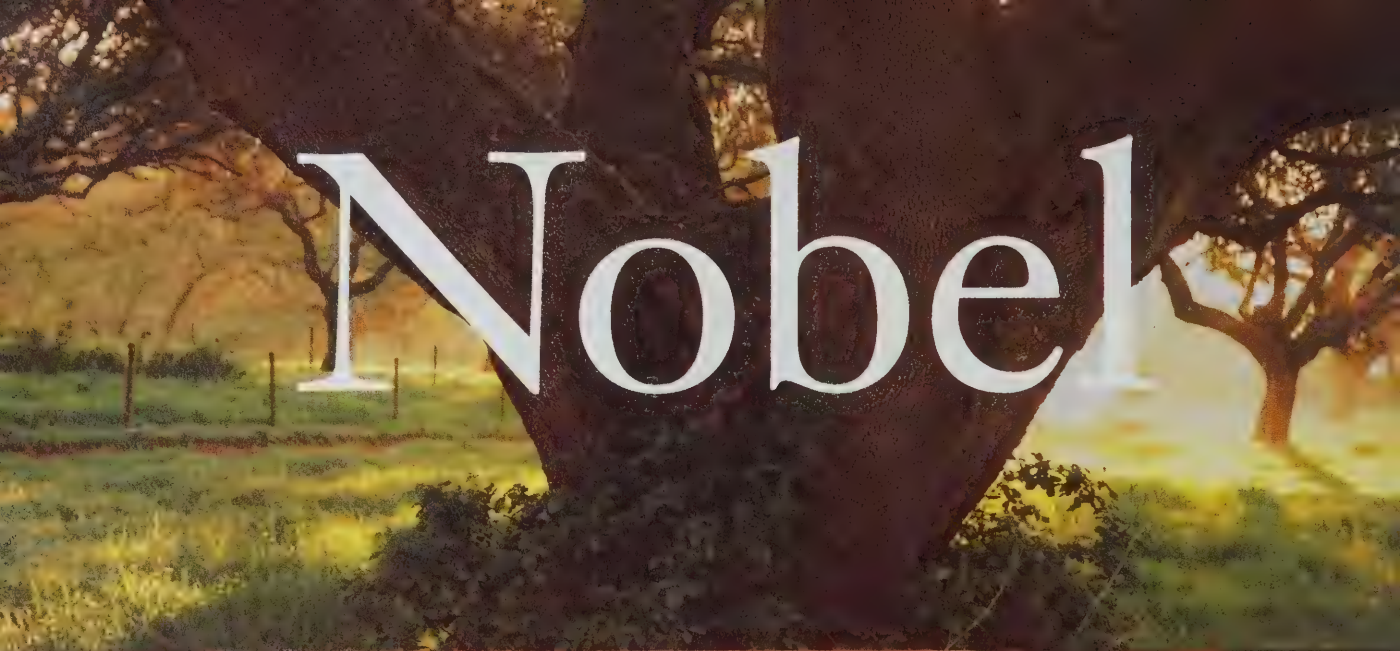
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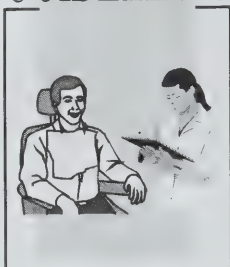
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DENTAL GUIDELINES



Report On the RCDS-CDHSRU Workshop On Developing Clinical Guidelines/Standards of Practice

James L. Leake, DDS, DDPH, M.Sc., FRCD(C)

Patricia A. Main, DDS, DDPH, M.Sc., FRCD(C)

Graharn L. Woodward, B.Sc., M.Sc. BDS (Rand)

ABSTRACT

Investigators from the Community Dental Health Services Research Unit (CDHSRU) held a workshop to test a model for developing clinical guidelines/standards of practice, which are required under the Regulated Health Professions Legislation. Forty-two individuals from Ontario and Canada, including dentists, representatives of the public, and professionals, participated in the three-day workshop, held under the auspices of the quality assurance committee of the Royal College of Dental Surgeons of Ontario (RCDS). Through direct experience, workshop participants sought to learn each of the steps, as defined by the literature, involved in clinical guideline development. Ultimately, they hoped to recommend steps for RCDS to follow in developing standards of practice.

To ensure that a realistic and valid model emerged from the workshop, a real topic, namely the management of smooth surface enamel lesions in permanent teeth, was used to develop and test clinical guidelines. Prior to the workshop, participants were sent literature on one of five aspects of the topic, as well as papers describing the methodology of critically appraising the literature, and partially-completed templates outlining the basic steps to be followed.

During the first evening and first morning of the workshop, participants listened to presentations on

the development of clinical guidelines, the prevalence of smooth surface lesions, the role of economics in guideline development, and the necessary considerations in writing clinical guidelines. Under the leadership of trained facilitators, they then worked in small groups to write evidence-based recommendations and report them to the other workshop participants for feedback. Using this feedback, they returned to their groups to revise their recommendations and work on the workshop's overall recommendations to the RCDS. The day concluded in the evening, when the workshop facilitators and coordinators met to edit the groups' recommendations into a consistent format for presentation to all participants.

On the second morning, the participants attended a plenary session to review the evidence-based recommendations developed by the groups, as well as their overall recommendations on the steps to be followed by the RCDS.

Ultimately, workshop participants partially completed the templates and developed preliminary evidence-based recommendations on the management of enamel smooth-surface caries. Based on their experiences, they recommended a seven-step process for the future development of clinical practice guidelines/standards of practice in Ontario. These steps are recommendations only, and are not RCDS policy.

SOMMAIRE

Des chercheurs du Groupe de recherche des services communautaires de santé dentaire (GRSCSD) ont tenu un atelier afin de tester un modèle pour élaborer des directives cliniques ou des normes d'exercice, lesquelles sont exigées en vertu de la Loi sur les professions de la santé réglementées. Quarante-deux personnes de l'Ontario et du Canada, dont des dentistes, des représentants du public et des professionnels, ont participé à cet atelier de trois jours qui a été tenu sous les auspices du comité du Collège royal des chirurgiens dentistes de l'Ontario (CRCD) chargé d'assurer la qualité des soins. Par l'expérience directe, les participants se sont initiés à chacun des points qu'il faut suivre, tels qu'ils sont définis par la littérature, pour élaborer des directives cliniques dans l'espoir d'en recommander au CRCD par la suite.

Afin d'assurer que l'atelier produise un modèle pratique et valable, on s'est servi, pour formuler et éprouver des directives, d'un sujet réel, à savoir la gestion des lésions aux surfaces lisses de l'émail. Avant l'atelier, on avait fait parvenir aux participants de la documentation portant sur cinq aspects du sujet choisi, une description de la méthode à employer pour faire une évaluation critique de cette documentation, et des modèles partiellement remplis indiquant les principaux points à suivre.

Au cours de la première soirée et du premier matin de l'atelier, on a présenté aux participants des exposés sur l'élaboration des directives cliniques, la prévalence des lésions aux surfaces lisses, le rôle de l'économie dans l'élaboration des directives cliniques et les points qu'il faut considérer en en formulant. Sous la direction de coordonnateurs qualifiés, ils ont ensuite travaillé en petits groupes, rédigeant des recommandations fondées sur des preuves et les présentant aux autres participants pour avoir leurs commentaires. Forts de ces commentaires, les petits groupes ont revu leurs recommandations et ont travaillé sur l'ensemble des recommandations devant être présentées au CRCD. La journée s'est terminée dans la soirée, alors que les coordonnateurs se sont réunis pour réviser les recommandations des participants et pour les leur présenter dans un texte cohérent.

Le second matin, les participants ont, en séance plénière, révisé les recommandations fondées sur des preuves élaborées par les groupes ainsi que l'ensemble des recommandations touchant les points que le CRCD doit suivre.

En fin de compte, les participants de l'atelier ont fini de remplir les modèles et ont élaboré des recommandations préliminaires fondées sur des preuves touchant la gestion des lésions aux surfaces lisses de l'émail. En s'appuyant sur leurs expériences, ils ont recommandé une méthode en sept points pour l'élaboration future de directives cliniques ou de normes d'exercice en Ontario. Ces points sont des recommandations seulement et non une politique du CRCD.

Introduction

Professional ethics require dental care providers to present patients with full and accurate information on the likely benefits, potential risks, and costs of all possible treatment options. But accurate risk/benefit estimates may be difficult to provide, as the prevalence and severity of caries¹ and periodontal disease today are less than we formerly experienced or believed.² Given the changing disease patterns, the actual net benefit from new and even old te-

chnologies is less certain.³ As evidence of this uncertainty, Ontario dentists vary considerably in their knowledge and application of clinical procedures, and some of their reported practices are inconsistent with current evidence.⁴ Every member of the profession should be concerned if decisions on patient care are inconsistent or variable, rather than being grounded in the profession's unique body of scientific knowledge.

This concern is already part of the social culture. Ontario society, through legislation,⁵ now requires the provincial licensing authorities for each health profession to "... develop, establish and maintain programs and standards of practice of the profession ...". The quality assurance committee of the Royal College of Dental Surgeons of Ontario (RCDS) has announced that it plans to develop evidence-based standards of dental practice⁶ using an open, consultative approach. This approach has been endorsed by the Ontario Dental Association (ODA).⁷

Evidence-Based Health Care

The trend toward evidence-based health care is so profound a change that some have termed it a paradigm shift.⁸ Evidence-based care replaces the apprentice-learned, experiential-consolidated, and expert-driven basis for clinical decision making with careful reference to evidence contained in the medical/dental literature. However, not all the literature is of equal quality.

The Canadian Task Force on the Periodic Health Examination⁹ (CTFPHE) and the Agency for Health Care and Policy Research¹⁰ have developed models that rank the quality of the evidence available from the literature. The highest quality of evidence comes from the studies with the strongest design, randomized controlled trials (RCTs). The lowest quality of evidence is opinion, based on clinical experience or descriptive studies (e.g. case reports). Between these two extremes lie non-randomized trials, observational studies, and comparisons between groups with and without intervention in different times and places.

Figure 1 shows CTFPHE's model. CTFPHE uses a letter grade to classify any recommendation (i.e., to include or exclude a service). Scores range from A (good evidence to include) to E (good evidence to exclude). Using such an approach, all services can be graded based on the strength of the science underlying their development, and then classified according to whether practitioners should include them, or not, in their practice.

Defining Standards Of Practice and Clinical Practice Guidelines

The Oxford Dictionary¹¹ defines standard as "object or quality or measure serving as basis or example or principle to which others conform or should conform, or by which the accuracy or quality of others is judged."

In dentistry, not all standards relate to clinical care. Provincial licensing authorities may also issue standards in other areas, such as record keeping¹² or infection control.¹³ These standards are often based on other kinds of evidence, such as current legislation and legal precedent.

We have defined "standards of practice" as guidelines that describe the process of care, which are issued by an authority (such as the RCDS) for the purposes of providing a benchmark by which care is judged.¹⁴ The advantage of this definition is that it allows access to the methods of development of clinical practice guidelines, but leaves the ultimate decision on what should be issued as a standard of care to the legislated organization.

The Institute of Medicine¹⁵ (IOM) in the United States defined practice guidelines as "... systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."

Practice Guideline Development

Others have described the process of developing medical practice guidelines.^{10,16,17} Field and Lohr¹⁸ provided a table listing the desir-



able attributes of clinical practice guidelines, and Hayward et al¹⁹ presented a protocol to guide physicians on how to assess the validity of clinical practice guidelines.

Efforts to develop evidence-based practice guidelines or standards of care in dentistry lag behind the initiatives in medicine. Friedman²⁰ developed treatment criteria to guide the assessment of the technical quality of dental care. Bailit et al²¹ tested their standards in 47 patients, but these standards were not widely disseminated. Some direct service programs developed manuals outlining procedures that staff could follow to assure that only effective care is provided.²²⁻²⁴ Helfrick²⁵ reported on the failure of early attempts to develop standards in the United States. Bader and Shugars²⁶ provided assessment criteria for guidelines in dental practice, but when they assessed the dental guidelines issued by several agencies, they found that "... there are few valid and practical clinical guidelines available for use by practising dentists ..."

Based on a consensus conference of 35 dentists, followed by a mail review by 45 different practitioners, the American Dental Association (ADA) developed practice parameters for 12 oral health conditions.²⁷ Although the parameters "... are intended, foremost, as an aid to clinical decision making ...," they are very general. For example, the parameter on restoring dental caries advises that:

"The dentist should consider the characteristics and requirements of each case in selecting the material(s) and techniques to be utilized ... (and) ... The restorative material selected should restore form and function, and withstand the forces of occlusion... " No other guidance is provided on how the dentist should advise a patient on which material to select. There is no reference to an evidence-based approach being used in the development of the ADA parameters, nor are any references cited in the document.

In England, the Advisory Board in General Dental Practice²⁸ has issued a self assessment manual and standards for general dental practitioners. While there are references

Quality of Evidence

- I: Evidence obtained from at least one properly randomized controlled trial.
- II-1: Evidence obtained from well-designed controlled trials without randomization.
- II-2: Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group.
- II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category.
- III: Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees

Classification of Recommendations

- A: There is good evidence to support the recommendation that the condition be specifically considered in a periodic health examination.
- B: There is fair evidence to support the recommendation that the condition be specifically considered in a periodic health examination
- C: There is poor evidence regarding the inclusion or exclusion of the condition in a periodic health examination, but recommendations may be made on other grounds
- D: There is fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination
- E: There is good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination

Fig. 1: Assessing the Evidence For Efficacy Of Preventive Or Treatment Technologies
Source: The Canadian Task Force on the Periodic Health Examination. (1994) *The Canadian guide to clinical preventive health care*. Ottawa, Canada, Health Canada.

to scientific publications, there is no indication or claim that the level of evidence concept was used to develop these standards.

By 1993, only one dental regulatory and licensing agency for the dental profession in Canada, the College of Dental Surgeons of British Columbia,²⁹ had developed guidelines for standards of practice.

The preface to the guidelines states that they "... set down the criteria to be considered during the delivery of dental care in this province ... (and) ... may be considered in determining the appropriate standards of practice in professional review and courts of inquiry..."

The guidelines are quite general, however. For example, they list 10 factors that should be considered when selecting a restorative material, and state "... the practitioner

will adhere to sound scientific and clinical knowledge when making selection choices ..."

The RCDS has issued guidelines for about 20 years. Since November of 1994, guidelines issued by the college have contained a notice stating that: "College guidelines contain practice parameters and standards which should be considered by all Ontario dentists in the care of their patients. It is important to note that these guidelines may be used by the college or other bodies in determining whether appropriate standards of practice and professional responsibilities have been maintained."

Stephens et al³⁰ have issued a note of concern about the trend to guideline development in Canada. Briefly, they hold that the guidelines development process has failed (in the United States?) because the process lacked sufficiently wide input from the "...

Generic Template for Workgroups

- 1 Target population:
 - 1.1 Describe the patient populations to which this guideline applies.
 - 1.2 Describe patient populations excluded from this guideline.
- 2 Clinical problem:
 - 2.1 Describe the clinical problem including prevalence to which this guideline applies.
 - 2.2 Describe clinical problems to which this guideline does not apply.
- 3 Clinical flexibility:
 - 3.1 Describe any clinical situations in which this guideline need not apply.
 - 3.2 Discuss any patient factors, such as patient preferences, which may override this guideline.
- 4 Summary of the evidence:
 - 4.1 Describe the search strategy to collect evidence.
 - 4.2 Describe the criteria used to include/exclude evidence.
 - 4.3 Describe each reasonable or important option including:
 - i) devices and clinical procedure
 - ii) ease of use in clinical settings
 - iii) cost estimates of implementing the technique in clinical practice, e.g., training costs, capital costs of equipment or others
 - iv) likely cost (estimated money or time) per patient
 - v) quality of the evidence supporting the use of the technique
- 5 Comparison of costs:
 - 5.1 Compare relative outcomes and costs of the options.
- 6 Description of relative importance of the potential outcomes:
 - 6.1 Describe the relative importance (value) of the outcomes of the options (e.g. for restorative techniques — no treatment) vs. watchful waiting, vs. treatment over one or more years;
- 7 State evidence-based recommendation and any minority views
- 8 Provide any comments or suggestions for further research.

Fig. 2:

teaching institutions, specialty societies, or the profession at large." They suggest that three elements are important: selecting areas where guidelines could be effective in improving care; inclusion of all legitimate interests in the process, plus experts in biostatistics and health care economics; and a definitive statement of the intention or the purpose of guideline development.

Community Dental Health Services Research Unit Experience In Developing Program Guidelines

CDHSRU is a partnership formed between the department of community dentistry, faculty of

dentistry, University of Toronto, and the City of North York Public Health Department (NYPHD). Both departments work together to research problems faced by the community dental services division of the NYPHD. One of the research objectives was to develop evidence-based program guidelines.³¹ Accordingly, topics for review were selected, the prevalence of the condition was determined, and evidence on current practices was assembled and critically appraised. Based on this evidence, all necessary revisions were made to the program guidelines. They were then reviewed by an internal staff panel as well as an external panel. Once they had received the approval of both pan-

els, the literature reviews and their respective guidelines, including any minority reports, were distributed. The guidelines were then issued to staff, and training sessions were held on how to use the guidelines in their respective practice. Provider compliance with the guidelines is assessed on an ongoing basis.

RCDS Experience In Developing Clinical Guidelines

RCDS has had considerable experience in developing guidelines in clinical areas such as infection control,¹³ training requirements for limited procedures,³² and record keeping.¹² However, they have been slower to develop guidelines that would inform dentists and patients which clinical procedure is best in a particular situation (i.e. clinical practice guidelines).

Purpose Of Workshop

Accordingly, we proposed a workshop to engage a group of dentists and others in a process that the RCDS could use to establish standards of practice, as required by legislation.⁵ We planned to follow the process used for developing clinical practice guidelines. In our view, it was self-evident that appropriately worded published guidelines become a standard. This has already occurred in British Columbia, and it is in line with the notice that is currently published as part of the RCDS guidelines. By participating in such a process, participants would "learn through experience" the necessary steps, and recognize how others need to be involved.

The specific purpose of the workshop was to follow and obtain participant feedback on a model that the RCDS council could use to establish standards of dental practice. By the end of the workshop, therefore, we expected to define:

- the required steps in the guideline development process;
- the documentation required at each step;
- who should be involved and their role at each step; and, if time permitted:



- the process for implementation and dissemination of clinical practice guidelines; and
- the monitoring of practitioner adherence to the guidelines.

Methods of the Workshop

Selecting and Defining the Topic

In conjunction with the quality assurance (QA) committee, we selected the management of early (excluding endodontic and extraction care) enamel caries on smooth surfaces of permanent teeth as the topic. We divided the topic into five sub-topics for groups to work on:

Group 1: What are the accuracy and costs of diagnostic systems/technologies for the diagnosis of smooth surface enamel caries?

Group 2: What are the accuracy and costs of risk assessment systems for smooth surface enamel caries?

Group 3: What are the efficacy/effectiveness and costs of clinical (professionally-applied) remineralization technologies?

Group 4: What are the efficacy/effectiveness and costs of home-care/self-care remineralization technologies?

Group 5: What are the comparative benefits, harms and costs of tooth-colored restorations versus amalgam in smooth surface coronal caries?

Assembling the Evidence

We conducted computer-aided searches on each topic area using prior specified MeSH headings on Medline (from 1991 to 1995). The citations, including titles, authors and abstracts, resulting from the searches were copied to word processing files according to topic. Each abstract was reviewed on computer screens by the authors, who then indicated whether the article appeared to warrant further examination. Any article that was requested by any one of the three reviewers was photocopied. Each photocopied article was then scanned by the three authors against pre-established

criteria and scored for "quality" including the level of evidence and relevance to the problem. The references of the selected articles were searched for relevant publications, which were also copied and reviewed. No attempt was made to find the so-called grey evidence (i.e. presentations at conferences etc.).

We then met to decide which articles would be sent to the participants to be read in preparation for the workshop. We selected three to eight articles from those which best met the pre-established criteria, and which demonstrated the range of possible tests/interventions in each topic area. In addition, we included three to five articles on methodology for rating evidence in each participant's package. We selected the methodology articles from articles published by the evidence-based medicine working group⁸ as well as from our personal files of seminal articles.

We also wrote to each provincial licensing authority in Canada to request copies of their clinical practice guidelines, or standards of practice, and for the evidence on which they were based.

Developing the Templates

We then developed templates for the work groups to follow. These were based on the work of the Institute of Medicine.¹⁸ The templates led the work groups through the necessary steps to achieve a complete examination of each topic. Information, up to and including the description of the search strategy (step 4.2), was completed by the coordinators and sent out to participants in advance. With some variation for specific topic areas, the templates were similar to the one outlined in Fig. 2.

We also reviewed the literature on how others had developed guidelines, and this information was presented to the workshop as input for the recommendations of the most appropriate model. The process developed independently in Ontario for the NYPHD³¹ and the Ontario Cancer Treatment and Research Foundations (OCTRF) are very similar.

Inviting Participants

The RCDS QA committee invited representatives of the Ontario Faculties of Dentistry, the Canadian Dental Association, the Ontario Dental Association, specialist groups, and interested general practitioners to attend the workshop. Individuals who accepted the invitation were assigned to one of the five work groups by the RCDS, and the curriculum, selected literature and methodology articles for their topic area, appropriate template, and levels of evidence criteria were couriered to them.

Scientific Program

We arranged four presentations to help prepare the groups for their work. The chair of the department of clinical epidemiology and biostatistics at McMaster University, Dr. George Browman, used the title "Can Practice Guidelines Have Teeth." He stated that the selected method of guideline development should account for anticipated problems in guidelines adherence by practitioners. He also described the guideline development process of the OCTRF, which is designed to incorporate the input of practitioners into evidence-based statements about practice. He pointed out that while there is evidence that clinical guidelines do influence the process of care, only preliminary evidence exists to indicate that they improve outcomes. Dr. David Banting of the faculty of dentistry, University of Western Ontario, talked on "The art and science of diagnosing dental caries." To make an accurate diagnosis, the clinician needs to estimate the risk of the disease and decide whether a diagnostic test is necessary. If so, a suitable test must be used. His summary of the evidence showed that, for the general population, the probability of experiencing a new smooth surface enamel carious lesion was about 10 per cent in any one year, but that the rate of progression was slow. It requires three to four years for interproximal caries to progress through the enamel, at which point the lesion should be restored.

**Table I****Number Of Articles Considered and Distributed By Coordinators to Participants For the Workshop**

Group	Identified on Medline	Copied for Review	Sent to Participants	Additional Methods Sent
Diagnosis	101	44	3	4
Risk Assessment	113	45	7	4
Professionally Applied Remineralization	178 + 303	30	5	5
Self-Applied Remineralization	539	62	8	4
Restorative Materials	1,453	83	5	3
Total	2,687	264	28	20

Dr. Amiram Gafni, from the Centre for Health Economics and Policy Analysis at McMaster University, discussed the place of economic considerations in developing standards of care. He pointed out that the real cost of an intervention was the foregone opportunity to provide something else. Although the dollar costs of providing medical care to patients have not been of concern with medicare, their value increasingly needs to be considered on a willingness to pay basis. Dr. Gafni suggested that the dollar costs of care could be omitted from the guidelines, and that the decision as to whether it should be provided left to the payor.

Dr. James Leake, from the Community Dental Health Services Research Unit, led the group through some of the considerations in developing evidence-based practice guidelines for smooth surface enamel caries. He provided examples of previous work, the rules for evidence-based decision making (**Fig. 1**), and reviewed the templates.

Facilitator Selection and Training

Five individuals who were familiar with the levels of evidence concepts, and who had experience in the development of evidence-based guidelines, were invited to facilitate the work groups. Dr. Patricia Main facilitated the consensus building plenary session on the last morning. On the afternoon preceding the workshop we conducted a brief training ses-

sion for the facilitators, and reviewed the rationale, methods and the likely areas of difficulty for the work groups.

Organizing the Work

The work groups heard presentations Thursday evening and Friday morning. They began their work at 1 p.m. and made their preliminary evidence-based recommendation to all participants from 3 p.m. to 4 p.m. Using the comments they received as a starting point, the work groups met to amend their reports. They were also free to work on the workshop's final suggestions to the RCDS on the process to develop practice guidelines. At the end of the day, the completed templates containing the work group's evidence-based recommendations, and their suggestions for the RCDS, were handed in. That evening the coordinators and the facilitators arranged the evidence-based reports and the process recommendations into presentation format. Saturday morning, all participants met to receive and review the evidence-based recommendations (9 a.m. to 10 a.m.) and to review and develop further suggestions for the RCDS on the best process to follow when developing clinical practice guidelines for dentistry (10 a.m. to 1 p.m.)

Results of the Workshop

The Evidence

The MeSH headings for each of the five search strategies, the pre-

established selection criteria, and a list of the articles are available on request. For the group dealing with the professionally applied remineralization topic, we conducted an additional search to try to identify more articles of sufficiently high quality. **Table I** shows the summary of the number of articles considered at each stage of the evidence gathering process. In all, 2,687 abstracts were considered and 244 articles were copied. An additional 20 articles were identified from the citations provided in the first 244 articles, and also copied. Depending on the group to which they were assigned, participants received from three to eight topic-specific articles and three to five methodological articles. Copies of all the articles used by the work group participants were sent to the facilitators.

Attendees and Participation

Forty-two people attended the workshop. Most of them were dentists, but three public representatives on the RCDS council, the registrar for the College of Dental Hygiene in Ontario, and one staff person each from ODA and CDA attended. Participants were deliberately assigned to work groups where they had no special expertise so that everyone could participate equally in the discussions, and to encourage the recommendations to flow from the evidence available. Participation was enthusiastic and continued at a high level until close.



Results Achieved By the Participants

The preliminary evidence-based recommendations from each of the groups were developed and arranged in a tabular format, similar to the one used by the Periodic Health Examination Task Force. Only one of the groups was able to complete the comparison of outcomes and costs for the various options, and one group was able to provide the dollar costs of the options they considered. Problems surfaced in evaluating the strength of the evidence for diagnostic tests where the methods do not fit into the level of evidence format (RCTs to expert opinion).

Agreed Upon Steps For the RCDS

In plenary session, the workshop agreed to seven steps in writing the guidelines. Edited in the interest of space, these were:

- 1 Frame the question.
 - 1.1 Develop a protocol for choosing topics requiring guideline development based on distribution of care services, identified needs, and selected outcomes.
 - 1.2 Clearly define the problem in consultation with key stakeholders.
- 2 Assemble and review the evidence.
- 3 Develop a preliminary evidence-based report (EBR) with supporting literature and level of evidence.
- 4 Review and revise the EBR.
 - 4.1 Circulate the EBR for review.
 - 4.2 Revise the EBR where necessary.
 - 4.3 Develop the clinical guideline based on the revised EBR.
 - 4.4 Circulate the revised evidence-based report and the draft clinical guideline for comment.
 - 4.5 Revise the guideline based on comments and re-circulate for comment.
- 5 Adopt and publish the new guideline.

- 6 Disseminate the guideline through education and other means.
- 7 Schedule review according to steps 1 to 6.

Who Should Be Involved

While not specifically stated by the workshop, an interpretation of the nature of the discussion suggests the following allocation of responsibilities: Step 1 should be the responsibility of the RCDS, perhaps in conjunction with a national coordinating process. Steps 2 and 3 do not need to be done by the RCDS, but could be contracted and completed by the contractor's reviewer, who must be competent in clinical epidemiology and, if not a dentist, work under the guidance of a dentist who is familiar with the issues and aware of the "grey" evidence. Step 4 could be the responsibility of the contractor, under the authority of the contracting agency (e.g. RCDS). Reviewers (Step 4.1) would include those from dental faculties, the ODA, other dental organizations, and the public. The workshop did not state explicitly who should actually write the draft guideline (Step 4.3), but it might be the contractor in consultation with the RCDS. Step 5 would be the responsibility of the RCDS. Again, the workshop was silent on who should conduct Step 6, but there are opportunities for both dental faculties and the ODA to be involved. Step 7 would need to be initiated by the RCDS.

Other Comments

Other comments were provided for consideration by the college. Again, with some editing, they include:

1. The RCDS needs to clarify its definitions of standards and clinical guidelines;
2. The RCDS should review what others have done;
3. There should be a process that can be shared nationally;
4. The literature on practitioner behaviors should be consulted to learn the best ways to influence them;

5. Ethical values as well as data must inform the development of guidelines;
6. The guideline process should ideally maximize the oral health of the population, and participants felt the profession would want to be involved in the entire process;
7. Future reviewers (at Steps 4.1 and 4.4) would need additional training in critically appraising evidence;
8. The issue of resource implications within the seven-step process for guideline development is as yet unresolved.

Conclusions

1. We developed search strategies, evidence-based templates, and a workshop format to test and obtain feedback on a process to develop evidence-based clinical practice guidelines that could be used by the RCDS to develop and issue standards of dental practice.
2. The workshop was able to test the process and define the steps the RCDS should follow to develop standards of dental practice in Ontario. The process revealed many of the problems likely to be encountered, and the participants developed additional comments for the RCDS to consider.
3. Unlike a previous workshop,³³ the templates on the evidence-based recommendations for the various topic areas were not fully completed. This was likely due to the more rigorous expectations defined by the templates, the brief time, the incomplete evidence gathering process, the difficulty participants had when they were critically appraising the evidence that was provided, and the interest in forming recommendations on the overall process.
4. Support for an RCDS-led, open, evidence-based approach was achieved and clarified in the development of the steps to be recommended to the RCDS.
5. Participants called for national cooperation on the task of writing standards of care. ■



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CLINICAL



Barodontalgia Among Flyers: A Review of Seven Cases

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ABSTRACT

Once referred to as "flyer's toothache," barodontalgia is defined as tooth pain occurring with changes in ambient pressure. It usually occurs in people who fly or dive. It can develop in conjunction with sinusitis, and in teeth experiencing pulpitis after restorative treatment, new and recurrent caries, intra-treatment endodontic symptoms, dental and periodontal cysts, or abscesses. Although the causal process of barodontalgia is not well understood, it may be related to pulpal hyperemia, or to gases that are trapped in the teeth following incomplete root canal treatment.

Patients who are frequently exposed to changes in ambient pressure should be encouraged to follow good oral health practices, attend regularly-scheduled dental recall examinations and accept the timely completion of restorative treatment to minimize the possibility of developing barodontalgia.

By employing a classification system to document cases of barodontalgia, dentists will be better prepared to provide appropriate and successful treatment.

Seven case reports of barodontalgia are presented and compared to previously documented cases. The author also reviews the reasons why military flyers are more likely to develop barodontalgia than others, although the passengers and crews of commercial airliners may also suffer from this condition.

SOMMAIRE

Jadis appelée le mal de dents des aviateurs, la barodontalgie est définie comme une douleur dentaire due à des variations de pression atmosphérique. Elle se manifeste ordinairement chez les personnes qui vont en avion ou font de la plongée. Elle peut se développer conjointement avec une sinusite et dans des dents atteintes de pulpite après un traitement de restauration, de caries nouvelles ou récidivantes, de symptômes endodontiques durant un traitement, de kystes dentaires ou parodontaux, ou d'abcès. Bien qu'on ne comprenne pas bien le processus de causalité de la barodontalgie, on pense qu'il est lié à une hypérémie pulpaire ou à des gaz retenus dans les dents après un traitement radiculaire incomplet.

Aussi convient-il d'inciter les patients souvent exposés à des variations de pression atmosphérique à prendre de bonnes habitudes d'hygiène bucco-dentaire, à visiter le dentiste pour des examens de rappel réguliers et à accepter en temps opportun l'achèvement de leurs traitements de restauration afin de minimiser les risques d'avoir une barodontalgie.

En utilisant un système de classification pour documenter les cas de barodontalgie, les dentistes seront mieux préparés pour offrir un traitement qui convienne et qui soit couronné de succès.

Dans cet article, on présente sept rapports de cas de barodontalgie et on les compare à des cas antérieurement documentés. De plus, on repasse les raisons pour lesquelles les aviateurs de l'armée sont plus susceptibles que les autres personnes de développer une barodontalgie, même si les passagers et les équipages des avions de ligne commerciaux peuvent également souffrir de cette affection.

Introduction

Although flyer's toothache, also called aerodontalgia, was first noted during the Second World War, it was renamed barodontalgia — tooth pain occurring with changes in ambient pressure — after it was observed that tooth pain could also occur during diving.¹⁻³

Aircrew stationed at Canadian Forces Base Moose Jaw, Saskatchewan occasionally present to the base dental clinic complaining of barodontalgia. Not all of the patients in question are pilots. Barodontalgia can also affect flight engineers and other crew members. Therefore, for medical and dental purposes, the term "active aircrew" in the Canadian Forces, as used in this paper, includes several occupations in addition to that of pilot and navigator.⁴

CFB Moose Jaw is responsible for training flight instructors, as well as for conducting basic jet flying training. It is also the home of

the Canadian Forces Air Demonstration Squadron — the Snowbirds.

Barodontalgia can occur in patients who are exposed to changes in ambient pressure. Seven such cases are presented here.

Case 1

A 24-year-old male jet instructor-pilot reported an incident of transient sharp pain on ascent one month after a moderate-depth occlusal amalgam restoration with a glass ionomer liner had been placed in an upper left molar, as well as more constant moderate pain. He reported that the tooth had been asymptomatic for several weeks following restoration. During this period, his flying was limited to low level flights (under 3,000 feet). However, he experienced moderate pain in the restored tooth during his first flight at a higher altitude.

On clinical and radiographic examination, there were no abnormalities — other than a mild positive reaction to the cold test. The pilot indicated that the moderate pain he experienced during this higher-altitude flight was the only adverse symptom his tooth had demonstrated subsequent to restoration. After a diagnosis of reversible pulpitis, the restoration was replaced with a zinc oxide and eugenol (ZOE) temporary restorative material (IRM). After one month, the temporary restoration was replaced with amalgam, but the ZOE base was retained. The patient did not report any subsequent adverse symptoms.

Case 2

A 32-year-old male jet student-pilot had two shallow Class II amalgam restorations placed in teeth 46 and 47. He presented to the dental clinic 10 days later complaining of pain on ascent both earlier that day and the day before. The pain generally occurred as he ascended through 7,000 to 8,000 feet, increased slightly, and then dissipated.

At ground level, the post-restoration sensitivity of the teeth to cold had gradually decreased, and the teeth were asymptomatic in low-level flying during the eight days following the operative pro-

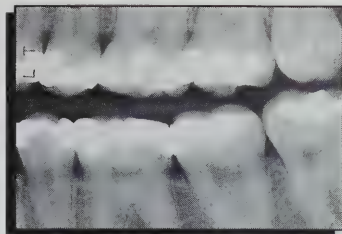


Fig. 1: Case 4, bitewing radiograph taken three months before the episode of barodontalgia. Tooth 27 demonstrates a mesio-occlusal restoration and a diffuse radiolucency near the distal part of the restoration. On clinical examination, this tooth displayed extensive buccal and distal caries and was the source of the painful episode during flight.

cedure. On resuming flying at higher altitudes, he began to experience mild pain. Both the radiographic appearance of the teeth and their reaction to the heat test were within normal limits, but one tooth demonstrated a mild positive reaction to the cold test. Cold sensitivity is not unusual 10 days after restoration. The patient declined to have this restoration temporarily replaced with ZOE, since he expected to continue low-level flying during the following week. However, he stated that he would seek treatment if the barodontalgia recurred. He did not return.

Case 3

A 32-year-old male patient who had been trained on fighter aircraft and had served in several capacities as an air demonstration pilot reported a history of spontaneous pain in the area of tooth number 26. The pain occurred on ascent while flying. On clinical examination, the tooth appeared to have a hairline fracture of a marginal ridge. The tooth was restored. Five months post-restoration, the patient presented to the dental clinic complaining that he experienced a loud "pop" in the region of the restored tooth while flying. This was accompanied by a sharp, lingering pain of an intensity that caused his eyes to water. Since the restored tooth was still painful and showed a deep cuspal fracture adjacent to the restoration, a diagnosis of irreversible pulpitis was made. The tooth was treated by root canal therapy and all symptoms disappeared. Had the patient been fly-

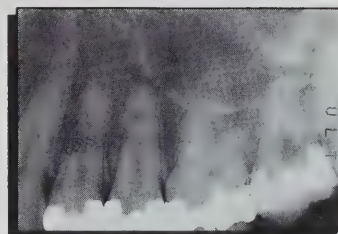


Fig. 2: Case 4, two weeks after restoration with "IRM" tooth 27 became acutely painful. The radiograph shows the extreme depth of the restoration.

ing a challenging aerobic or combat mission, his incapacitation could have had serious flight safety ramifications.

The patient's posttreatment experience is noteworthy because of its effects on his flight performance. For several months after his acutely painful in-flight episode, every time the patient ascended through the altitude at which he had experienced the barodontalgia, he underwent tremendous fear and angst. Fortunately, he was eventually able to resume his normal flying duties with no after thoughts related to this adversity.

Case 4

The morning after he experienced an episode of pain in an upper left molar, a 23-year-old male student-pilot presented to the dental clinic. During flight, the pilot's instructor directed him to put his aircraft into a steep dive from 31,000 feet. He immediately began to experience dental pain. The intensity of the pain increased to an unbearable level during the vertical descent. Although he had no previous history of pain in any teeth, the student admitted that he had experienced occasional sensitivity to sweets in the symptomatic area.

In general, this patient was in a very poor state of dental health and had multiple carious lesions. This was his first visit to the base dental clinic. As a recent military enrollee, he had been transferred several times before beginning flight training at CFB Moose Jaw and had been unavailable for den-

tal treatment. Although the periapical area of the symptomatic, previously-restored tooth appeared normal, a radiographic examination revealed that the tooth had large buccal caries, extending under a shallow mesio-occlusal restoration. It was subsequently restored with a large five-surface ZOE filling as an interim measure (Figs. 1 and 2). However, the sudden onset of intense pain in the same tooth two weeks later necessitated the initiation of endodontic treatment. Following completion of the endodontic treatment, the tooth was restored with two paraposts, an amalgam core, and a five-surface amalgam restoration.

After the dental rehabilitation of this patient, barodontalgia did not recur. Curiously, he denied having any adverse symptoms in his teeth during the high altitude indoctrination (HAI) course (see appendix) that he was given just a few months prior to his first flight.

Case 5

During the hypobaric chamber portion of a HAI course, a 23-year-old male aircraft technician experienced moderate pain during a simulated ascent to 25,000 feet. The pain dissipated on return to ground level. It did not recur during the final exercise in the hypobaric chamber, which involves explosive decompression. Two weeks prior to his HAI course, the patient had begun endodontic therapy on an upper molar. One week later, he experienced a mild toothache, which he self-treated with analgesics. However, the patient did not recount his experiences until some time after the conclusion of the course, during an appointment to complete his endodontic treatment. Some residual pulpal debris from the apical area of the root canal system was removed at that time. The patient is fully recovered.

Case 6

A 26-year-old aircraft technician reported some discomfort on inhalation on cold winter days (the outside temperature at that time of year was -30°C). In addition, he complained that he had experienced mild pain in two maxillary anterior teeth during his HAI

course. This occurred during a simulated air ascent in the hypobaric chamber.

An endodontic cold test produced a mild positive reaction in tooth 22, and there was radiographic evidence of some recurrent caries in teeth 11 and 22. These teeth were restored, and the patient did not report any further incidents of barodontalgia.

Case 7

A 33-year-old male patient described an episode of very intense "eye-watering" and continuous pain in his left infra-orbital area. The pain, which also involved teeth 23 to 26, occurred as he was gradually descending from 35,000 feet. He was flying in a Tutor jet trainer on a flight that did not include any aerobatics. The intense pain continued for most of the descent and only dissipated near ground level. The patient also reported a similar occurrence when he was a passenger on a commercial airline flight from Toronto to Saskatoon, although the pain was not as intense. Since he had no detectable caries, no other adverse symptoms in any teeth, no abnormal clinical conditions, and admitted to having mild congestion in his left maxillary sinus, the condition was determined to be consistent with barosinusitis, with pain referred to the maxillary teeth. The patient declined any treatment, as he felt his congestion was improving, and did not return.

Barodontalgia As a Dental Pathological Phenomenon

In each of these cases, the patients' barodontalgia was related to an underlying dental or antral pathosis. The change in ambient pressure was not the cause of the symptoms, but a contributing factor.

The mechanism by which dental pain occurs in conjunction with changes in ambient pressure is still unclear. Although the causative process is not well understood, it may be related to pulpal hyperemia, gasses trapped in teeth following incomplete root canal treatment, or abscesses.⁵⁻⁷

The clinical contexts of barodontalgia that have been reported in the literature include: periapical

infection, periapical abscesses, caries, deep restorations, residual dental cysts, sinusitis, and postsurgical interruptions in the mucosa.⁶ Postsurgical interruptions are of concern in divers, as some SCUBA oxygen regulators produce positive oral pressure and thereby force air into the interrupted tissues.^{2,6,8} Similarly, the oxygen systems (which include masks) in high-performance military aircraft provide oxygen under pressure at altitudes above 37,000 feet.⁹⁻¹² Below that altitude, they provide oxygen on demand, diluted with cabin air.¹⁰

Early reports hypothesized that air, which had been trapped under dental fillings, caused barodontalgia. Now, however, the dental literature states that "pain occurring at simulated high altitudes is associated with the nearness of caries to the pulpal tissue, and that changes in altitude are more important than the degree of altitude."⁶ It is abundantly clear that the presence of air bubbles under fillings does not result in barodontalgia,⁵ and that teeth with deep, restored cavities may have chronic pulpitis, whether or not they have exposed pulps under the restorations. These teeth are likely to demonstrate barodontalgia, particularly after cavity preparation. However, this would not necessarily imply that every tooth with chronic pulpitis will always demonstrate barodontalgia in hypobaric situations.⁵

To examine patients demonstrating barodontalgia in a hypobaric chamber, Kollman^{5,7} studied German Air Force aircrew members who regularly received scheduled training in such a facility. The training is very similar to the Canadian Forces HAI course, which exposes participants to a series of reduced air pressures similar to those that could occur during flight. Kollman describes the "flight" profiles in detail. He found that many of the subjects who demonstrated barodontalgia had recurrent caries, either under or adjacent to restorations. Some subjects required simple restorative treatment, while others needed root canal therapy to restore the teeth and prevent further symptoms.

A high proportion of the patients receiving dental treatment at the CFB Moose Jaw dental clinic also fly (250 pilots alone). This may explain why barodontalgia is observed in the clinic at a relatively high frequency (an estimated five to six cases yearly) relative to the civilian environment. Many "civilian" dentists may never see a case of barodontalgia in their practice.

Canadian Forces' aircrew are forbidden to fly for 12 hours, minimum, after the injection of local anesthetics. The restriction period is even longer if they have undergone surgical procedures or taken any drugs. In both cases, an affected aircrew member can only be "ungrounded" by an authorized flight surgeon.^{4,9,13} Therefore, neither the administration of drugs nor the proximity of dental treatment to the commencement of flying appears to be a predisposing factor in the onset of barodontalgia.

Subclinical dental pathoses can become significantly symptomatic at altitude.⁶ It is also known that the degree of change in air pressure may be more important than the ambient pressure itself in contributing to barodontalgia.⁵ An examination of various aircraft pressurization systems may therefore reveal some interesting findings that could ultimately account for the apparent higher frequency of barodontalgia in military flyers.

When aircraft fly at altitudes above 10,000 feet, human physiology requires that both pilots and crew must either have supplemental oxygen delivered through a face mask or, alternatively, the aircraft cabin must be pressurized to permit unaided breathing.¹⁰

In a commercial airliner, the cabin air is condensed or pressurized, yielding a cabin "altitude" that is different from the actual aircraft altitude. For example, in today's state-of-the-art Boeing 757 passenger airliner, the cabin air pressure is gradually increased as the aircraft ascends, so that at an actual altitude of 42,000 feet, the cabin altitude is just 8,000 feet¹⁴⁻¹⁶ (Table I). Basically, the thin outside air at 42,000 feet is brought into the aircraft and then condensed or pressurized to create a

Table I

A Comparison of Cabin Pressures at Various Aircraft Altitudes¹⁴⁻¹⁹

Aircraft Altitude*	Cabin Altitude (Pressure)*			
	Boeing 757	Dash 8**	CT-114 Tutor	CF-5/CF-18
10	1.0	2.5	8.0	8.0
20	2.2	5.0	11.0	8.0
30	4.0	—	18.0	13.0
40	7.0	—	24.5	16.0

*In thousands of feet.

**One version of the DeHavilland Canada Dash 8 twin-engine turboprop aircraft with a ceiling of 25,000 feet is used as a 50-passenger carrier by many regional commuter airlines.

higher inside air pressure (lower cabin altitude). This allows unaided breathing. Passengers experience a pressure change from ground level to only 8,000 feet, and not the actual 42,000 feet through which the aircraft ascends. However, because the aircraft cabin pressure can vary to this degree, or more, depending on the aircraft, a passenger or crew member could still develop barodontalgia in susceptible teeth.

In contrast to commercial airliners, the cockpit of the Tutor jet trainer and CF-5/CF-18 fighter aircraft does not pressurize at all until the aircraft has reached an altitude of 8,000 feet.¹⁷ This is significant, as atmospheric pressure changes the most between 0 and 5,000 feet. As the Tutor climbs to 17,500 feet, the cabin altitude stays at a constant 8,000 feet, then slowly rises to 24,500 as the aircraft nears 40,000 feet.

Similarly, the CF-5 and CF-18 fighters maintain a cabin altitude of 8,000 feet while the airplane ascends to an altitude of 23,000 feet. Above that level, the cabin altitude increases to reach 16,000 feet as the aircraft altitude approaches 40,000 feet.^{18,19}

By way of comparison, during a simulated training flight in a hypobaric chamber the subject could experience a full pressure change, from ground level to an altitude of 40,000 feet. Oxygen masks must be worn in this exercise, as the hypobaric chamber essentially duplicates the actual atmospheric pressure that the subject would experience at various altitudes.⁵

Clearly, military pilots and passengers in high performance aircraft undergo a greater ambient pressure change during flight than other flyers. When flying to 40,000 feet, for example, the ambient pressure change experienced by military pilots is two to three times greater than it is for passengers or crew members flying in commercial aircraft. Moreover, this pressure change occurs at a faster rate, particularly when military crew members are engaged in vertical aerobatic or combat flying, as they frequently are. As a result, military flyers may be more susceptible to experiencing barodontalgia in predisposed teeth, both during flight in high performance aircraft and during simulated flights in a hypobaric chamber. Yet, as shown in **Case 7**, and from the author's clinical experience, aircrew and passengers flying in commercial aircraft can still demonstrate barodontalgia if they have a dental predisposition.

Case Discussion

In each of the reported cases, the patient already had some pre-existing dental pathology before the episode of barodontalgia occurred. As such, the exposure to changing ambient pressure was not a direct cause of the symptoms, but, rather, a contributing environmental factor.

Cases 1 and 2 confirm that some teeth can demonstrate barodontalgia shortly after restoration. In both cases, the patients' pulpitis was transient and reversible, either with time, or by using ZOE as a

Table II

Proposed System of Classification of Barodontalgia⁶

	Chief Complaint	Clinical Finding	Diagnosis	Treatment
Class I	Sharp momentary pain during ascent (decompression); asymptomatic on descent (compression) and afterward.	Caries or restoration with inadequate base. Tooth is vital. PA shows no periapical pathosis.	Acute pulpitis	Zinc oxide-eugenol temporary followed in two weeks with a well-based permanent restoration. Endodontics, if irreversible.
Class II	Dull throbbing pain during ascent (decompression); asymptomatic on descent (compression) and afterward.	Deep caries or restoration. Tooth is vital/non-vital. PA shows no periapical pathosis.	Chronic pulpitis	Root canal therapy, or Extraction of un-restorable tooth.
Class III	Dull throbbing pain during descent (compression); asymptomatic on ascent (decompression) and afterward.	Caries or restoration. Tooth is non-vital. PA shows periapical pathosis.	Necrotic pulp	Root canal therapy, or Extraction of un-restorable tooth.
Class IV	Severe persistent pain after ascent (decompression) or descent (compression).	Caries or restoration. Tooth is non-vital. PA shows definite periapical pathosis.	Periapical abscess or cyst.	Root canal therapy, and/or surgery, or Extraction of un-restorable tooth.

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sedative restorative material. **Case 1** also reinforces the advisability of placing ZOE bases under deep amalgam restorations.⁵

With the advent of all-etch bonding systems for bonding both composites and amalgam to teeth, it may be possible to decrease or even eliminate barodontalgia. Unfortunately, these materials were not available in our clinic when the first two cases were treated. It would be interesting to know whether the patients' postoperative symptoms would have been present if a bonding system such as Allbond 2, Tenure, Amalgambond or Photobond had been used when their original restorations were placed. In our clinic, teeth treated with Allbond 2 or Amalgambond have shown few or no adverse symptoms. A study into the effectiveness of all-etch bonding systems in decreasing or com-

pletely preventing the occurrence of a phenomenon like barodontalgia would likely be beneficial.

Since it is not clear whether the coronal fracture in **Case 3** occurred prior to or during flight, it is impossible to state conclusively if decompression alone can result in the fracture of teeth. However, it may be possible that a pre-existing coronal fracture can be exacerbated on decompression. Dental practitioners should therefore correct even minor hair-line fractures of the teeth, and preclude the development of more serious complications.

Most documented cases of barodontalgia involving previously restored teeth have occurred on ascent.⁶ **Case 4** is an exception to the rule. It shows that teeth with extensive caries, which are not associated with a restoration, can experience barodontal-

gia on descent. This may indicate severe chronic pulpitis or an exacerbation of a chronic pulpal state, necessitating root canal therapy. Since the mesio-occlusal restoration on the symptomatic tooth was intact on examination, and the pulpitis likely occurred as a result of the deep buccal caries, it is the author's contention that an un-restored tooth with active deep caries could demonstrate barodontalgia. Canadian Forces aircrew members are generally attentive to their oral health. Furthermore, military dental treatment policies provide for regularly scheduled dental care for all service members, which generally prevents a patient from falling into an undesirable state of dental health. Both these factors may explain why no examples of this condition have been demonstrated previously.^{5,6,20}

Case 5 demonstrates that intra-treatment pain from incomplete endodontic therapy can be more intense in hypobaric conditions. However, in the author's clinical experience, if pulpal tissue is thoroughly removed during pulpectomy treatment, the canal is not over-instrumented, and there is no internal suppuration, patients who have undergone endodontic treatment generally have not been symptomatic during their flying activities. This is also borne out by Rauch.⁶ Furthermore, patients in our clinic who required endodontic treatment in symptomatic teeth have continued their flying activities, following their first appointment, but prior to the completion of treatment, without reporting any instances of barodontalgia.

Case 6 demonstrates an occurrence of barodontalgia similar to those investigated by Kollman.^{5,7} Recurrent caries under or adjacent to restorations can contribute to barodontalgia, particularly when the subject is in a hypobaric chamber. Good dental health is the most important factor in the prevention of barodontalgia, particularly when a patient is exposed to large changes in ambient pressure.

As shown in **Case 7**, sinusitis may be the primary contributing factor in most cases of barodontalgia involving multiple teeth, on descent. Usually, correction of the sinusitis is all that is required to prevent the recurrence of dental pain during flight.

In his extensive literature review on the subject, Rauch⁶ proposed a classification system of barodontalgia (**Table II**). This system is similar to the one proposed by Goethe et al.,³ which is recommended by the Fédération Dentaire Internationale (FDI). A comparison of the author's seven case reports against the table shows that when barosinusitis is discounted as a possible cause of the patients' symptoms, the treatment rendered was consistent with Rauch's classification system. This table may prove invaluable to the dentist who normally has little contact with patients who fly, but who must suddenly diagnose and treat a patient who has suffered from barotrauma.

Conclusion

Barodontalgia is defined as tooth pain occurring with changes in ambient pressure. It can develop when pulpitis is present following restorative treatment, or in teeth with new and recurrent caries. It can also occur in conjunction with intra-treatment endodontic symptoms, and with specific pathoses such as dental and periodontal cysts, abscesses, and referred sinus pain. However, the causal mechanism of barodontalgia is not clearly understood.

This review of seven cases shows that barodontalgia is a very painful phenomenon that may occur in the passengers and/or crew of commercial and military aircraft. As such, it can result in serious consequences for pilots who fly high performance jets, particularly during difficult manoeuvres such as formation flying, aerobatics and air combat.²¹

Barodontalgia can be largely avoided by maintaining a high level of oral health, including regularly scheduled dental recall examinations and the timely completion of restorative treatment. Oral health is therefore vitally important to all patients involved in activities that expose them to changes in ambient air pressure.

Dental practitioners who encounter patients complaining of barodontalgia may achieve better results if they employ Rauch's classification system to supplement the diagnostic and restorative sciences.

Appendix 1

A High Altitude Indoctrination (HAI) course, also called Aero-Medical Training, is a course of several days' duration that is conducted by the Canadian Forces Medical Services (CFMS) for all military aircrew to familiarize them with the physiology of flight, hypoxia and aircraft safety systems. In addition, the CFMS provides a one-day condensed HAI course for non-aircrew members who expect to fly as passengers in high-performance aircraft. This latter version of the course involves a didactic portion of one half-day covering the above subjects. Like the extended course, this is followed by a series of "flights" in a

hypobaric (depressurization) chamber: ascent to 5,000 feet and return to ground level; ascent to 25,000 feet (with supplemental oxygen) and individual exercises of removing oxygen masks to experience hypoxia, then a return to ground level; and finally, "explosive" decompression (sudden depressurization in less than one second from zero to 10,000 feet).^{11,12}

Kollman⁵ described the sequence of training used by the German Air Force in simulated flights in a hypobaric chamber. The "flight profile" is very similar to the Canadian Forces HAI. ■

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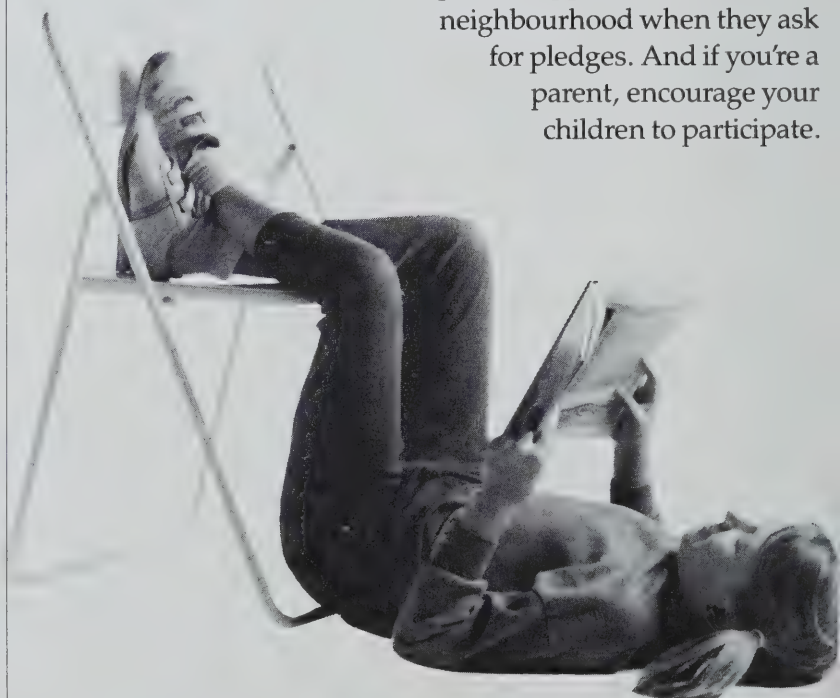
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The Exhibit Hall is also the perfect place for the dental team to regroup during the Convention. The entire team can review the issues raised in the lecture rooms and examine the equipment, products or services appropriate to the job description of each member. Consequently, **valuable learning** and **constructive discussion** will take place on-site.

This year, for your convenience, the three dental associations serving dentists from Québec and the rest of Canada will have a common exhibit area. The Canadian Dental Association, the Québec Dental Surgeons Association, and the Ordre des dentistes du Québec will join together in a booth especially designed to welcome you. Elected officials and staff members from the three associations will be on hand to meet with you and provide you with information about the services that are offered. Furthermore, you can spend some time at the CDA/QDSA/ODQ booth, learning about the Internet. "Surfing Stations" will be set-up and facilitators will be there to assist you as you access information that can help you in your practice.

When planning your agenda during the Convention, arrange to spend time in the Exhibit Hall. It will certainly prove to be time well spent!

See you in the Exhibit Hall!

Members of the 1996 Organizing Committee

PRELIMINARY ALPHABETICAL LISTING OF EXHIBITORS

The CDA 1996 Exhibit Hall will be open on Monday, August 19 and Tuesday, August 20 from 9:00 am to 6:00 pm. Situated in the Place Bonaventure, the exhibit hall is adjacent to lecture rooms and in close proximity to all convention hotels.

Participants are invited to the exhibit hall on both Monday and Tuesday mornings at 7:30 am for coffee, muffins and music. This early rendez-vous will continue until the first Keynote Session of the day which begins at 8:15 am. This year, each Keynote Session will focus on the popular topic of Nutrition. Monday morning's session features *Robert Pritikin* whose presentation is entitled, "The Fat Instinct: How You Can Outsmart It!". The afternoon session at 1:15, will be given by *Dr. Michael Jacobson* speaking on "Nutrition and the Politics of Food". Tuesday's keynote session begins also at 8:15 am with *Dr. Joseph Schwarcz* and his lecture entitled, "Sense, Nonsense & Science. *Louise Lambert-Lagacé's* lecture will complete the four sessions on nutrition with her message, "The Recipe for a Successful Diet".

In addition to all the Convention specials that will be offered by the exhibitors, the Exhibit Hall will also be the place for exciting draws — a one year lease of a Mercedes Benz and 2 Air Canada tickets to any North American destination (some restrictions apply)!

Be sure to set aside time to visit the 1996 Trade Exhibition.

3M Canada Inc.

A

A Smile Is Forever
A-Dec, Inc.
A.R. Medicom Inc.
ABEL Computers Ltd.
Aboutface International
Academy of General Dentistry
Adams Brands Inc.
AFP / Dent-X
Amadent Corporation
Arcona Health Inc.
Ash Temple Limited
Associacao paulista de
cirurgioes dentistes
Astra Pharma Inc.
Aurum Ceramic / Classic

B

B.C. Dental Meeting
Belmont / Takara Co.
Can. Ltd.
Biodent
Bisco Dental Products
(Canada) Inc.
Block Drug Company
(Canada) Ltd.
Brasseler Canada
Brighter Breath - Oxyfresh
Buffalo / Bolton Dental Mfg.
Byte Dental Systems Inc.

C

C.N.T.M. Pharmaceuticals
Canadian Dental Association
Canadian Dental Service Plans Inc.
(CDSPI)
Canadian Hospital Specialties Ltd.
Carl Zeiss Canada Ltd.
Cerum Dental / Panasil
Cerum Ortho Organizers
Clinical Research Dental Supplies
Colgate Oral Pharmaceuticals
Coltene / Whaledent
Compagnie Dentaire America Inc.
Criticare Systems, Inc.

D

Degussa
Den-Mat
Den-Tal-Ez / Star Dental
Den-Tal-Ez / Custom Vacuum
DentalMac by Healthcare
Communications
Denticiel De Coni-Soft Inc.
Dentistry Canada Fund
Dentsply Canada Limited
Designs for Vision, Inc.
Digital Music Express (DMX)
Canada
Distribution CDN
DMD (Dental / Medical
Diagnostic Systems)
Dulong Medical Inc.
Duro-Test Canada Inc.

E

Ellman International, Inc.
Exan

F

Flex Solutions Inc.
Focus Multisystèmes Inc.
Foxmeyer Santé Inc.
Fresh Breath Centre

PRELIMINARY ALPHABETICAL LISTING OF EXHIBITORS

G

GC America
Gilbert's Dental Supplies Inc.

H

Healthgroup Financial /
Midland Walwyn
Healthline
Henry Schein Canada
Heraeus Kulzer
Higa Manufacturing Ltd.
Hoffman-La Roche Ltd.
Hu-Friedy Mfg. Co., Inc.

I

Innova Corp. 
International Tissue Services Inc.
Ivoclar Williams

J

J. Morita USA, Inc.
J.F. Jelenko & Co.
John O. Butler
Johnson & Johnson Inc.
Justi Products, A Division of
American Tooth Industries

K

Kerr Corporation
Kilgore International, Inc.
Kodak Canada Inc. - Dental
Products

L

Laboratoire Dentachrome Inc.
Laboratoire Lafond Desjardins
, et Associés Inc.

M

M&CC Dental Cabinet Systems
M.D.L. Professional Practice
Sales Ltd.
Mada International Inc.
Marus Dental International
McNeil Consumer Products
Company
Medi-Dent Service / Professional
Services
Medical Innovations
Medical Mart Supplies Ltd.
Miltex Instrument Company, Inc.
Mo-Dent Ltd.
Mosby Times Mirror Professional
Publishing

N

New Image Industries, Inc.
Nobel Biocare

O

Oral-B Laboratories
Orascopic Research, Inc.
Ordre des dentistes du Québec

P

Patterson Dental / Dentaire
Canada Inc.
Peerless International, Inc.
Philips Electronics / Domestic
Appliances
Premier / ESPE Canada
Pro Dentec Canada
Pro-Art Dental Laboratory
Procter & Gamble Inc.

Q

Québec Dental Surgeons
Association

S

Sacor Inc., Dental Division
Safari Portable Dental Inc.
Sci Can
Score International Inc.
Scotiabank / Experdent
Septodont Inc. Canada / Novocol
Pharmaceutical
Shofu Dental Corporation
Siemens Electric Limited-Dental
Systems
Sigmacon Surgical Products Inc.
Sonicare / Optiva
Southern Dental Industries
Space Age Manufacturing &
Marketing Inc.
Space Maintainers
Specialty Medco Inc.
Steri-Oss
Straumann Canada Ltd.
Sulcbrush Inc.

T

Teledyne Water Pik Canada
Tuttnauer

U

Ultravena Industries Canada Ltd.
Unident Limited

V

Verilux Canada Corporation
Vivadent

W

W.L. Gore & Associates, Inc.
Warner Wellcome
Whitehall-Robins Inc.
Wright Dental Canada Limited
Wrigley Canada



PRELIMINARY SCIENTIFIC PROGRAM

SATURDAY, August 17

8:30 - 11:30			1:30 - 4:30	
COTE ST-LUC HILTON	HANDS-ON WORKSHOP	PIERRE BOUDRIAS IMPLANTS EN	PIERRE BOUDRIAS IMPLANTS (CONT'D) EN	
ROOM 4 PLACE BONAVENTURE	LIMITED ATTENDANCE LECTURE	DAVID HORN BROOK MASTERING AESTHETICS AND ADHESION EN	DAVID HORN BROOK MASTERING AESTHETICS AND ADHESION (CONT'D) EN	
ROOM 6 PLACE BONAVENTURE	LIMITED ATTENDANCE LECTURE	LOUIS TOUYZ A NEW LOOK AT PERIODONTICS IN THE '90S EN	LOUIS TOUYZ A NEW LOOK AT PERIODONTICS (CONT'D) EN	

MONDAY, August 19

7:30		8:15 - 9:15		9:45 - 12:15		1:15 - 2:15		2:30 - 5:00			
ROOM 1 EXHIBIT HALL	COFFEE, MUFFINS & MUSIC	KEYNOTE R. PRITIKIN EN, SI		HERBERT BADER; JANE JONES SOFT TISSUE MANAGEMENT EN, SI		KEYNOTE M. JACOBSON EN, SI		PAUL BASS PRACTICE MANAGEMENT EN, SI			
ROOM 5 PLACE BONAVENTURE				MIKE SUZUKI ESTHETIC RESIN BONDED RESTORATION EN				WAVA TRUSCOTT GLOVES EN			
ROOM 6 PLACE BONAVENTURE				KENNETH SEROTA; GARY GLASSMAN ENDODONTICS EN				JON KAPALA GUIDING THE DEVELOPING DENTITION EN			
WESTMOUNT HILTON				RONALD ETTINGER MANAGEMENT OF GERIATRIC PATIENTS EN				DANIEL HAAS PHARMACOLOGY OF PAIN CONTROL EN			
OUTREMONT HILTON				HAROLD PERRY ORTHO-TMD/GRIEVE MEMORIAL EN				HERBERT BADER, JANE JONES SOFT TISSUE MANAGEMENT EN			
9:45 - 11:15		11:30 - 1:00		2:30 - 4:00		4:15 - 5:45					
ROOM 2 EXHIBIT HALL			INTERNET EN/FR	LÉON LEMIAN URGENTES ENDO. FR		RÉNALD PÉRUSSE LÉSIONS FR		MICHEL DESCHAMPS RADIOLOGIE FR			
ROOM 3 EXHIBIT HALL			GISÈLE BOURGEOIS PLAN. FINANCIÈRE FR	MICHEL COUTURE PARODONTIE - PSR FR		ÉRIC CARON MATÉRIAUX FR		RENÉ GUY LANDRY CONTRÔLE DE L'INFECTION FR			
ROOM 4 PLACE BONAVENTURE			BRIAN KUCEY CROWN PREPARATION EN	BRIAN KUCEY IMPRESSION TAKING EN		ALAN LOWE SLEEP APNEA FR		THOMAS OLSON TAX LOOPHOLES EN			
MT. ROYAL HILTON			MARION BALLA COMMUNICATION EN	ALAN DRINNAN ORAL LESIONS EN		RONALD ETTINGER GERIATRICS EN		DON McCALLUM PRACTICE SUCCESS EN			
VERDUN HILTON	YOUNG DENTIST PROGRAM ALL LECTURES IN THIS PROGRAM ARE PRESENTED IN ENGLISH AND HAVE SIMULTANEOUS INTERPRETATION			P. BASS STARTING A PRACTICE	P. VOLPÉ FINANCIAL MANAGEMENT	J. WOLLBORN INSURANCE	LUNCH & VISIT TO THE EXHIBIT HALL	M. SUZUKI RESTAURA- TIONS	H. ROSEN PERIO.	GOLDBERG/ WERBITT IMPLANTS	COCKTAILS

LEGEND: EN - ENGLISH; FR - FRENCH; SI - SIMULTANEOUS INTERPRETATION

PRELIMINARY SCIENTIFIC PROGRAM

SUNDAY, August 18

8:30 - 11:30			1:30 - 4:30		
VERDUN HILTON	HANDS-ON WORKSHOP	HERBERT BADER; JANE JONES PERIODONTAL INSTRUMENTATION EN			
COTE ST-LUC HILTON	HANDS-ON WORKSHOP	PIERRE BOUDRIAS IMPLANTS (CONT'D) — SECOND DAY EN		PIERRE BOUDRIAS IMPLANTS (CONT'D) EN	
WESTMOUNT HILTON	LIMITED ATTENDANCE LECTURE	WILLIAM BLATCHFORD PRESENTING IDEAL TREATMENT EN		WILLIAM BLATCHFORD PRESENTING IDEAL TREATMENT (CONT'D) EN	
LASALLE LACHINE HILTON	HANDS-ON WORKSHOP	GARY GLASSMAN; KENNETH SEROTA ENDODONTIC IMPRESSIONISM EN		GARY GLASSMAN; KENNETH SEROTA ENDODONTIC IMPRESSIONISM (CONT'D) EN	

TUESDAY, August 20

7:30		8:15 - 9:15		9:45 - 12:15		1:15 - 2:15		2:30 - 5:00	
ROOM 1 EXHIBIT HALL	COFFEE, MUFFINS & MUSIC	KEYNOTE J. SCHWARCZ EN, SI		JOHN NASEDKIN ANTERIOR CROWN & TOOTH COLOUR EN, SI		KEYNOTE L. LAMBERT-LAGACÉ / FR, SI		TREY PETTY INFECTION CONTROL EN, SI	
ROOM 2 EXHIBIT HALL				DEREK HILL PATIENT DRIVEN PRACTICE EN				GISÈLE BOURGEOIS RUNNING A SUCCESSFUL PRACTICE EN	
ROOM 3 EXHIBIT HALL				CHARLES COX DENTIN AND PULP ISSUES EN				CHARLES COX PULP FICTION EN	
WESTMOUNT HILTON				JOSEPH MASSAD HOW TO MAKE DENTURES FUN EN				JOSEPH MASSAD REMOVABLE DENTURES EN	
OUTREMONT HILTON				MARION BALLA BALANCING ACT EN				MIKE ENGELMAN IMPLANTS EN	
		9:45 - 11:15		11:30 - 1:00		2:30 - 4:00		4:15 - 5:45	
ROOM 6 PLACE BONAVENTURE				PATRICK CANONNE PÉDODONTIE FR	JACINTE LARIVÉE IMPLANTOLOGIE FR			GILLES GAUTHIER PROTHÈSES FR	DANIEL TANGUAY ORTHODONTIE FR
ROOM 5 PLACE BONAVENTURE				ROBERT SÉGUIN ABRASIFS FR	PIERRE MACKAY REST. CANALAIRES FR			HUAN PHAM COMPLIC. SINUSALES FR	DENIS ROBERT LA DIGUE FR
ROOM 4 PLACE BONAVENTURE				SAM YANKELL TOOTHBRUSH RESEARCH EN	TREY PETTY INFECTION CONTROL EN			ALAN DRINNAN MED. EMERGENCIES EN	THOMAS OLSON RETIREMENT EN
MT ROYAL HILTON				CARY SHAPOFF PERIO TREATMENT EN	DANIEL HAAS LOCAL ANAESTHETICS EN			CARY SHAPOFF PERIO. SURGERY EN	JOHN NASEDKIN ESTHETICS & FUNCTION EN
VERDUN HILTON				JON KAPALA TRAUMATIC INJURIES EN	LOUIS TOUYZ DENTINAL SENSITIVITY EN			MARY ANN KINDY COMMUNICATION EN	JOSEPH SCHWARCZ SCIENCE EN

LEGEND: EN — ENGLISH; FR — FRENCH; SI — SIMULTANEOUS INTERPRETATION

CDA 1996 Young Dentist Program

An exciting, innovative and practical YOUNG DENTIST PROGRAM is a new section of the CDA Convention in Montréal this year.

This full day program, **scheduled for Monday, August 19th** is designed especially for the "young dentist".

The Canadian Dental Association and the Canadian Dental Service Plans Inc. (CDSPI) want to help equip those who graduated in the last 10 years with the information and practical applications useful in establishing a flourishing and successful practice. For this reason, a full day program with seasoned and reputable speakers has been developed.

Monday's Young Dentist Program schedule is as follows:

7:30 am - 8:15 am

Coffee, muffins and music with other convention participants

8:15 am - 9:15 am

Keynote Session on Nutrition with Robert Pritikin,
"The Fat Instinct: How You Can Outsmart It!"

9:30 am - 10:30 am

"The 1990's: A Great Time to Start A Practice"
with Dr. Paul Bass
Learn about building the unstoppable team, creating partners out of your staff, obtaining the ultimate win-win game plan and the four-step success formula for achieving your goals.

10:30 am - 11:15 am

"Practical Financial Management for New Dentists"
with Peter Volpé
This seminar will reveal how to set achievable financial goals, understand your investment alternatives, use RRSP's effectively, make the most of tax planning strategies ... and more!

11:15 am - 12:00 pm

"Insurance Protection for Financial Well-Being"
with Jeff Wollborn
This lecture will explain what types of insurance and how much coverage you need at the start of your career.

12:00 pm - 1:30 pm

Lunch and visit of the Exhibit Hall
"Aesthetic Posterior Restorations" with Dr. Mike Suzuki
This presentation focuses on the direct composite resin applications on posterior dentition. Discussion includes indirect lab processed composite and porcelain inlays and onlays relative to their clinical applications and limitations.

1:30 pm - 2:15 pm

"Aging Periodontal Prosthodontic Patients - Problem Solving and Practice Building" with Dr. Harry Rosen
In this lecture, techniques will be discussed for salvaging aging dentitions and learning how grateful patients become excellent practice builders.

2:15 pm - 3:00 pm

"Osseointegration: Its Uses and Abuses" with Drs. Perry V. Goldberg and Marvin J. Werbitt
This clinical material will show how to avoid problems and will dramatically demonstrate how advances in surgical techniques and prosthetic components can be easily incorporated into everyday implant practice to both facilitate patient treatment and maximize function and aesthetics.

3:00 pm - 3:45 pm

Cocktails

3:45 pm

Plan to attend the Young Dentist Program today! Registration to the Convention gives you access to this program. Simply check the appropriate section of the enrolment form to receive your ticket!

CENTRE FOR BUSINESS OPPORTUNITIES

■ What is the Business Opportunities Centre and who is it for?

It is a service designed to match dental professionals with similar business needs.

If you are a dentist:

-  wanting to sell your practice
-  wanting to form an associateship
-  wanting someone to work in your office a few days a week
-  looking for employment
-  looking to work in someone else's office (even a few days a week)
-  wanting to buy a practice

... then the Business Opportunities Centre is for you.

■ How does this new service work?

Send your resumé, a letter and any other relevant information to the CDA Convention department outlining your business needs. We will then place an ad on your behalf on a bulletin board in a designated area at the Convention. **This service is totally confidential.** Your name will not appear on the bulletin board. Your business ad will be assigned a number and interested parties will leave their name and telephone number so that you may contact them and set up a meeting.



■ When is this service available?

This service is a new segment to the CDA 1996 Convention and will only be available during the meeting.

■ Where can I find out more information?

Call the CDA Convention department, Monday to Friday, 8:30 am - 4:30 pm at 1-800-267-6354.



Internet Information and Workstations

Sessions on the Internet will be available at the CDA Convention for registered participants. Facilitators will introduce you to the Internet and help you find the information you may need. They will guide you and give practical information on how to get connected to the Internet, how you can send and receive e-mail and will also demonstrate how to use the Internet in your practice by accessing CDA's home page.

In addition, an area will be set up in the CDA/ODQ/QDSA booth where you may receive some hands-on experience and try surfing the Net.



The annual Golf Tournament at the CDA 1996 Convention is brought to you by Aurum Ceramic/Classic and CDA. This event will take place on Sunday, August 18 at the Terrebonne Golf Course with a shotgun start at 9:00 am. This year's tournament will culminate in a \$100,000 hole-in-one contest. Golfers who are "closest to the hole" at a designated hole will have the opportunity of trying their luck at the \$100,000 prize.

CDA will also donate \$20 of each entry fee to the Juvenile Diabetes Foundation. Have fun, donate to a good cause and possibly win \$100,000 in one day!

Fun Run & Walk

Enjoy a brisk walk or invigorating run at the CDA 1996 Fun Run & Walk on top of Mount Royal Park!

Located in the middle of Montréal, Mount Royal is the most well-loved green space in the city. A 5 and 10 kilometre course around Beaver Lake and other scenic pathways has been mapped out. Your running/walking time will be recorded and prizes will be given out. Each participant will receive a 1996 Convention t-shirt and refreshments will be available.

To register for the Golf Tournament or the Fun Run & Walk, call CDA Conventions at 1-800 267-6354 or select the appropriate section on your enrolment form.





AUGUST 17 - 20 • **Montréal 1996** • DU 17 AU 20 AOÛT

CANADIAN DENTAL ASSOCIATION CONVENTION / CONGRÈS DE L'ASSOCIATION DENTAIRE CANADIENNE

ONE FORM PER PERSON

PRE-REGISTRATION & HOTEL RESERVATION FORM • Please PRINT

- Use **1 FORM FOR EACH INDIVIDUAL** you would like to register.
You may photocopy the enrolment form, or you can obtain additional forms by contacting CDA Conventions at 1-800-267-6354.
- EACH** individual's name should be printed clearly in the appropriate section. **EACH** individual form should select a **DELEGATE TYPE** in order to register for the Convention.

Check one:	Family Name	
☐ Dr.	First Name	Sex: ☐ M ☐ F
☐ Mr.		
☐ Ms.		
Street address		
City	Province	Postal Code
Office Telephone ()	Home Telephone ()	
Fax ()	CDA Membership Number	

LIMITED ATTENDANCE COURSES

Saturday, August 17th —

David S. Hornbrook — Mastering Aesthetics and Adhesion:
Dental Care for the 21st Century — All day lecture
Dentist \$ 135 _____
Dental Staff (non-dentist) \$ 65 _____

Louis Touyz — A New Look at Periodontics in the Nineties —
All day lecture
Dentist \$ 135 _____
Dental Hygienist \$ 65 _____

Sunday, August 18th —

William Blatchford — Presenting Ideal Treatment and
Getting a Yes! — All day lecture
Dentist (7% GST included) \$ 135 _____
Dental Staff (non-dentist) (7% GST included) \$ 65 _____

GST is included in the Limited Attendance Practice Management courses.
GST is not charged on Limited Attendance and Hands-on scientific courses.
Lunch is included in all day Limited Attendance and Hands-on courses.

***NOTE:** Every dentist enrolled for the Convention can register two (2) non-dentist staff members for the convention proper **FREE OF CHARGE**. The first or second non-dentist staff member to register *with* a dentist, choose "Registration Fees" Nil. Send Registration Form with that of the dentist.

HANDS-ON WORKSHOPS

Saturday, August 17th & Sunday, August 18th —

Pierre Boudrias — Implants: Basic Prosthetic Certification Course —
Two day hands-on workshop
Dentist (limited to 50 participants) \$ 295 _____

Sunday, August 18th —

Herbert I. Bader & Jane Jones — Scaling and Root Planing —
Half day hands-on workshop
Dentist/Dental Hygienist (limited to 40 participants) .. \$ 115 _____

Gary Glassman & Kenneth Serota — Endodontic Impressionism:
A Palette for Excellence — All day hands-on workshop
Dentist (limited to 40 participants) \$ 195 _____

CONVENTION

Choose only one delegate type. 1 registrant per form.

☐ **Dentist**
Member of CDA \$ Nil _____
Non-member of CDA (7% GST included) \$ 175 _____

☐ I will attend the Young Dentist Program
(Graduate 1986-96) \$ Nil _____
My year of Graduation _____

☐ **Spouse** (7% GST included) \$ 98 _____

☐ **Dental Hygienist** (7% GST included) \$ 98 _____
Dental Hygienist (See note below)* \$ Nil _____

☐ **Dental Assistant** (7% GST included) \$ 98 _____
Dental Assistant (See note below)* \$ Nil _____

☐ **Office Personnel, Office Manager,
Receptionist** (7% GST included) \$ 98 _____
**Office Personnel, Office Manager,
Receptionist** (See note below)* \$ Nil _____

☐ **Dental Technician** (7% GST included) \$ 98 _____

☐ **Student Dentist** \$ Nil _____
☐ **Student Dental Hygienist** \$ Nil _____
☐ **Student Dental Assistant** \$ Nil _____

* Students must provide proof of full-time attendance.

**Are you the person or one of the persons responsible for
purchases in the office?** ☐ Yes

SOCIAL EVENTS

- ☐ **Opening Ceremony** — Sunday, August 18th
(Subject to space availability — One ticket per Registration Form)
Will attend ☐ Yes ☐ No \$ Nil
- ☐ **Meet & Greet** — Sunday, August 18th
..... (7% GST included) \$ 55
- ☐ **President's Gala** — Dinner Cruise — Monday, August 19th
..... (7% GST included) \$ 75
- ☐ **Golf Day** — Sunday, August 18th
..... (7% GST included) \$ 125
- ☐ **Fun Run** — Tuesday, August 20th a.m.
..... (7% GST included) \$ 25
- ☐ **Visits and Tours** (See page 14 for details)
City Tour — August 17 (7% GST included) \$ 50
Old Montréal — August 18 (7% GST included) \$ 50
Knowlton — August 19 (7% GST included) \$ 50
Shopping — August 20 (7% GST included) \$ 50
- ☐ **Children (6-12 years)** Child's Age:
Sunday program (7% GST included) \$ 48
Monday program (7% GST included) \$ 48
Tuesday program (7% GST included) \$ 48

TOTAL (ALL sections) \$

Person/company responsible for payment:

☐ I wish to pay the above total by credit card:

☐ MasterCard ☐ VISA

Card #

Expiry Date

Name of Cardholder

SIGNATURE

☐ I enclose a cheque payable to the Canadian Dental Association.
Post-dated cheques will not be accepted.

CANCELLATION POLICY:

- Cancellation received, in writing, on or before July 26, 1996 — full refund
- Cancellation received, in writing, after July 26, 1996 — subject to a 25% administrative charge

NO REFUND AFTER AUGUST 10, 1996

INFORMATION ON REGISTRATION:

All participants registered for the Convention:

- have access to all general lectures of the Convention proper
- have access to the exhibit hall
- have access to the Opening Ceremony
- are entitled to register for the appropriate limited attendance lectures and hands-on courses
- are entitled to register for social events, visits and tours

Spouses and children have access to the Opening Ceremony only if they register for one or more of the Convention's day programs or if registered for the Convention. Spouses not registered for the Convention do not have access to the general lectures or to the exhibit hall.

To ensure that your requests are met — **please register early**. Advance registrations will be accepted until **July 26th, 1996** after which date forms will be returned to the sender. Each on-site registration will be subject to a \$30 administrative fee (GST included).

HOTEL RESERVATION

Type of Room:

☐ Single ☐ Double ☐ Twin ☐ Other (please specify)

☐ Smoking ☐ Non-Smoking

Special Requests:

Sharing with

Indicate your choice of hotel* (by numbering the boxes):

- ☐ Montréal Bonaventure Hilton \$149.00 single/double
- ☐ Queen Elizabeth \$148.00 single/double
- ☐ Château Champlain \$135.00 single/double
- ☐ Radisson/Auberge des Gouverneurs \$120.00 single/double
- ☐ Novotel \$106.00 single/double

* Prices do not include taxes.

Arrival Date:

Arrival Time:

Departure Date:

All changes and/or cancellations must be made **IN WRITING** through CDA Conventions. Fax to (613) 523-3062.

In order to reserve a room, a guarantee for the first night is essential. The guarantee will apply to the first night **ONLY**. To cancel your reservation advise CDA Conventions at least three (3) days prior to your projected arrival date.

CHEQUES WILL NOT BE ACCEPTED.

☐ MasterCard ☐ American Express ☐ VISA

Card #

Expiry Date

Name of Cardholder

SIGNATURE

DEADLINE for Reservations: July 26, 1996

ACCOMMODATION

- ☐ I do not require accommodation
- ☐ Other arrangements have been made

MAIL Pre-registration and Hotel Reservation Form with payment to:

1996 CDA Convention
1815 Alta Vista Drive
Ottawa, Ontario K1G 3Y6

OR FAX

(if paid by credit card): (613) 523-3062

MAKING YOUR AIRLINE RESERVATIONS

Special arrangements have been made with Air Canada to offer participants discounts on airfares.

To take advantage of this service, you must call Air Canada Convention Central at **1-800-361-7585** and quote event **CV960671**.

CDA Convention Social Program and Tours

The CDA Convention has several extra-curricular activities and events planned for Convention participants, spouses and guests. Here are the highlights of these events:

SOCIAL PROGRAM

Sunday, August 18

5:00 pm - 7:00 pm

OPENING CEREMONY



Michel Lauzière

The 1996 Opening Ceremony is brought to you by Ash Temple and CDA Conventions. A wonderful two hours of entertainment and learning await you. To begin, **Michel Lauzière**, a well-travelled and highly praised comedian will amaze, amuse and captivate you, his audience, for the entire time he is

on stage. **David Chilton**, well-known author of *THE WEALTHY BARBER*, will follow with a witty and humorous presentation entitled, "Learn for Yourself - Nobody Cares More About You". While this topic of personal money management is of a more serious nature, Mr. Chilton's no-nonsense approach and humor will present a wealth of financial insights to you in a pleasant learning atmosphere. Clowns will entertain the children during David Chilton's presentation.



David Chilton

Sunday, August 18

7:00 pm - 10:00 pm

MEET & GREET: CASINO NIGHT!

The Meet & Greet Casino Night follows the Opening Ceremony.

Croupiers will help you place your bets and try your luck. Bring the family and meet your friends at this casual and exciting game night. A light supper will be served.



Monday, August 19

7:00 pm - 8:00 pm: Cocktails

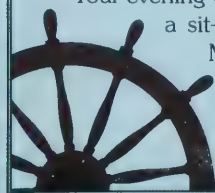
8:00 pm onwards: Dinner, dancing & cruise

PRESIDENT'S GALA DINNER CRUISE

Join your colleagues and relax after a busy Convention day onboard a boat anchored in the Montréal harbour.

Your evening will begin with cocktails, then you'll enjoy a sit-down dinner, take a short cruise on a Mississippi riverboat and finish the evening dancing under the stars.

Recommended dress is smart casual.



VISITS & TOURS



Saturday, August 17

DELUXE CITY TOUR

You will enjoy a visit aboard a deluxe motorcoach with a knowledgeable and experienced guide who will draw your attention to many of Montréal's tourist sites. Your trip will include visiting three of Montréal's primary attractions: The Olympic Tower, the Montréal Botanical Gardens and The Biodôme.

Sunday, August 18

DISCOVER OLD MONTRÉAL

A walking tour through Old Montréal is one of the most enjoyed tourist site-seeing excursions. Old Montréal has an abundance of history including a most remarkable collection of architecture. Spend your afternoon at the fascinating Pointe-à-Callière, Montréal's Museum of Archaeology.

Monday, August 19

A DAY IN CHARMING KNOWLTON

Knowlton, a charming little village just an hour away from Montréal, is rich in history and filled with craft stores, antique shops and local artist's boutiques. During your visit to Knowlton you'll have a delightful luncheon in a quaint old inn and have ample time for browsing and shopping in the afternoon.

Tuesday, August 20

"BEHIND CLOSED DOORS" SHOPPING EXTRAVAGANZA

A special outing exclusive to Convention participants who will have the opportunity to shop and save up to 50% in manufacturer and designer showrooms. You will visit furriers, leather manufacturers, sportswear, cruisewear and casualwear designers as well as a luggage and accessories distributor. (cash purchases only)

CDA ACCESS ADS offer guaranteed access to Canada's largest audience of dentists. To place your ad, call Neil McGillivray toll-free across the country at (800) 413-5734. In the Toronto calling area, please dial (905) 278-5075.

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SASKATCHEWAN - Kelvington: For
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(03/08)

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town of 16,000 with trading area
of 60,000. 4,500 active files.

Due to health reasons, vendor
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willing to stay on. Ideal for
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beautiful sunsets.

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(06/07)

ONTARIO - Toronto: Excellent
opportunity for one or two
periodontists with implantology
skills to purchase established,
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practice in a modern, well
located facility. Active recall
system, large referral base,
innovative office systems
with highly trained staff. Owner
will stay for phased transition.
Please reply to CDA ACCESS
Box # 2706. (06/08)

NEWFOUNDLAND - St. John's:
Practice for sale. Low stress,
low overhead in downtown
St. John's. Established three years,

1,400 patients with 40-50 new
patients per month. Two ops.
fully equipped with a third
plumbed. Two part-time
hygienists and excellent staff
make for an easy transition.
Dentist leaving only to attend
graduate school. Call Dr. K.F.
McCarthy at (709) 754-7010. (05/07)

NEWFOUNDLAND - Avalon Area:

For sale: A busy general prac-
tice. Approximately one
hour from St. John's. Three
operatories, full-time hygienist,
3,500 active patients. Grossing
approximately \$600,000 per
year. High percentage insurance
coverage. Owner anxious to sell.
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NOVA SCOTIA - Halifax/Dartmouth:

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sale in busy commercial park.
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solid recall program. Please
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NOVA SCOTIA - Truro Area:

Established seven-year-old family
practice for sale. For further
information call (902) 893-1088.

(06/08)

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NEW - KELOWNA, B.C.

*call for
details!*

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- Attractive lease in place
- Asset transaction - offers

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- 4 operatories, future 6
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- 1,100 patients
- Grossing \$500,000
- Flexible transition

KELOWNA, B.C.

- Retiring Dentist
- Well established
- 1475 active patients
- 3 ops - 1159 sq. ft.
- Call now!

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- Over 75 new patients per month
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- New leaseholds
- High quality equipment
- Opportunity for multiple purchasers

THE HEALTH PRO VALUATION REPORT

- Assets Approach
- Financial Approach
- Market Approach

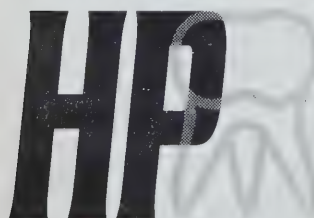
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WHITEHORSE - Yukon: Come and experience a pleasant Northern work environment. Whitehorse is a jewel of a community with a great strong arts group, sports for the entire family, as well as the great outdoors within minutes of your home. We require an associate as soon as possible. Please reply to: Dr. R. Pearson, #2 Bates Cres., Whitehorse, Yukon, Y1A 4T8. Phone (403) 668-4618. (03/07)

NORTHWEST TERRITORIES - Yellowknife: Associate required for a modern family dental practice with pleasant support staff. The clinic is located in the city of Yellowknife. Seeking a caring motivated individual interested in a long-term position. Please reply to CDA ACCESS Box # 2705. (06/08).

NORTHWEST TERRITORIES: Canadian Licenced Dentists. We have a full-time associate opportunity in our Inuvik clinic and rotating opportunities working with mobile Dental Teams serving remote Western Arctic Inuvialuit and Dene settlements. These are good opportunities for motivated, practically minded dentists with the right attitude and skills. Please forward your resume and a covering letter to Box 1360, Inuvik, NWT, X0E 0T0 or by fax to (403) 979-2774. Attention Dr. Dean Gould. (07/07)

BRITISH COLUMBIA - Vancouver: Exceptional opportunity for a pediatric dentist to join a well established, respected pediatric/orthodontic practice of the highest quality. We are three pediatric dentists

and two orthodontists seeking another pediatric dentist for permanent practice involvement. Excellent hospital facilities available for general anesthetic requirements. Our state-of-the-art practice is located in one of the world's most beautiful cities, offering all major recreational activities and a wonderful quality of life. Please call or write: Dr. Richard Kramer, 200 - 650 W. 41st. Ave., Vancouver, B.C. Canada V5Z 2M9 (604) 263-2422.

(07/07)

BRITISH COLUMBIA - Southeast: Full-time associate needed in Sparwood, B.C. Must be team oriented and motivated to provide high quality care. Area is great for skiers and outdoor lovers. Long-term commitment desired. Please contact (604) 425-0581 for more information.

(07/07)

BRITISH COLUMBIA - Nanaimo: Partnership/Practice for sale. If you are looking for the best opportunity in a dental practice on the West

Coast of British Columbia then read on. Our office is vibrant, well established, and well respected. Our office productivity is without comparison in the area. Our staff are superbly trained and motivated to provide comprehensive dentistry. Our new location is the best and brightest in the city. Our growth is exceptional. If you are a dentist committed to quality and success, you owe it to yourself to find out more. Call (604) 756-1300 (office), or (604) 756-1082(res.).

(06/07)

ALBERTA - Red Deer: We are seeking an energetic associate for a very busy practice built up over the last 19 years. Extremely active recall, crown and bridge, endodontic practice with heavy emphasis on hygiene. Associate would work days and extended hours in the evenings and Saturdays. Future buy-in option available to the right individual. Please reply to CDA ACCESS Box # 2700. (03/07)

DEPARTMENT OF ORAL HEALTH SCIENCES University of Alberta Edmonton, Alberta

The Department of Oral Health Sciences in the Faculty of Medicine and Oral Health Sciences is searching for a half-time clinical pediatric dentist. The person selected would then be free for half-time private practice or other endeavors. Responsibilities will include clinical, pre-clinical teaching, and lectures in pediatric dentistry including participation in the hospital program. The person selected would be on a three-year rolling term contract. The candidate should have qualifications from an accredited North American Postgraduate program and be eligible for licensing in Alberta, Canada. Salary and rank is commensurate with experience and qualifications. Deadline for applications: July 31, 1996. In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. Candidates should forward their curriculum vitae and the names of three references to:

Dr. G. Wayne Raborn, Associate Dean
3036 Dentistry Pharmacy Centre
University of Alberta
Edmonton, Alberta
T6G 2N8

The University of Alberta is committed to the principle of equity in employment. As an employer we welcome diversity in the workplace and encourage applications from all qualified women and men, including Aboriginal peoples, persons with disabilities, and members of visible minorities.

ALBERTA - Calgary Area: Dentist requires a full-time dental associate from August to January for a busy family practice (20 minutes from Calgary). Position will then become part time building to full time if the associate wishes. Excellent opportunity in a pleasant rapidly growing community. Contact: Larry Cooper at (403) 652-2182. (07/07)

SASKATCHEWAN - Saskatoon: Seeking an energetic and caring associate, with skills of a good team player, for our established seven-operator, extended-hour family practice. Fully computerized with emphasis on quality-oriented work. Very good income with option for immediate or future buy-in. Fax (306) 934-0036 or call (306) 933-1200 evenings. References welcome. (05/07)

MANITOBA - Central Region: Excellent opportunity for an associate with view to partnership in central Manitoba. Very busy, computerized, modern, six-operator office with a full-time hygienist. Both my current associates are leaving office within the next three months. Envious relaxed lifestyle (great fishing, canoeing, cross-country skiing, and golfing), four-day work week, no evenings or weekends and a low cost of living. If you are a highly motivated dentist looking to practice in a friendly office where you will be busy and appreciated then give me a call, Dr. Robert Fraser (204) 623-7289 evenings. Fax (204) 623-6162, or write to: Box 937, The Pas, Manitoba R9A 1K9. (07/07)

MANITOBA - The Pas: Associate dentist wanted. Busy eight-year-old clinic in central Manitoba requires a second full-time general practice dentist to start in October 1996. I have outgrown my current premises and will be constructing a new six-operator facility this summer. NDEB certificate required. Dentist with experience preferred. Fax resume to (204) 623-2206 or phone Dr. R. Monczka at (204) 623-2244. (06/08)

FACULTY OF DENTISTRY McGILL UNIVERSITY

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Applications are invited from dentists with graduate training and from scientists holding PhD degrees for full-time faculty positions. The Faculty of Dentistry is revising its undergraduate curriculum and is expanding its graduate programs in General Practice and Oral Health Sciences (MSc and PhD). Three research areas are being developed in collaboration with the Faculty of Medicine: oropharyngeal cancer (including oral rehabilitation and tissue engineering), chronic pain, and hard tissue biology (including biomaterials). Successful candidates will be expected to make major contributions to these missions and to obtain external research funding.

The University is committed to equity in employment. Furthermore, in accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

Applications will be considered until October 1, 1996, and should be sent to the following address, accompanied by a detailed curriculum vitae and the names and addresses of two referees:

**Dr. James P. Lund, Dean
Faculty of Dentistry
McGill University
3640 University Street, Suite M/28
Montreal, Quebec
H3A 2B2**

ONTARIO - Northern Region: A dental practice situated in Northern Ontario is looking for a full-time bilingual associate. Three satellite offices, situated less than two hours apart. Four dental hygienists, excellent opportunities. If you are interested please call Dr. Gilles Lecours (705) 372-1601. (06/08)

ONTARIO - Windsor: Full-time experienced and motivated associate required with buy-out within two years. This is a modern well-established family practice. Please reply to CDA ACCESS Box # 2703. (05/07)

ONTARIO - CAMBRIDGE Endodontist - Periodontist

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Partnership Opportunity
Please contact M. Riley
(519) 623-6858. (07/07)

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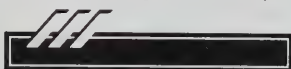
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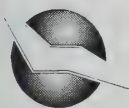


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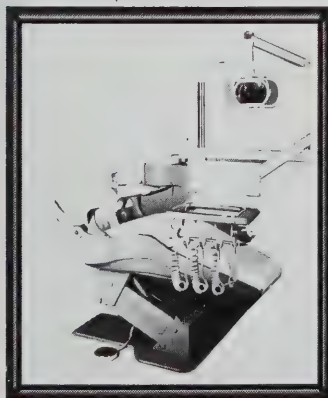
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INTERNATIONAL



August 10-16

43rd World Congress of Young Dentists Worldwide (YDW) and International Association of Dental Students (IADS) in Göteborg, Sweden. Contact the IADS & YDW Congress Committee, Odontologen, Medicinargatan 12 a, 8, 413 90 Göteborg, Sweden. Tel.: +46(0)31 773 32 08, or fax: +46(0)31 773 32 07.

August 12-16

Annual Meeting of the Canadian Association of Oral & Maxillofacial Surgeons held conjointly with the Australia/New Zealand Association of Oral & Maxillofacial Surgeons in Cairns, Australia. Contact the ANZAOMS/CAOMS Conference, P.O. Box 1082, Cairns 4870 Australia. In Canada, call: (604) 322-3025.

August 19-23

21st North Queensland Dental Convention in Cairns, Australia. Contact Peter Martin, North Queensland Dental Convention, P.O. Box 388, Cairns 4870, Australia. Tel.: (070) 51 2351, or fax: (070) 31 2351.

August 21-24

2nd World Congress of Hungarian Dentists in Budapest, Hungary. Contact the Congress office of MATE, Ms. Zsuzsa Pintér, Buda-

pest, P.O.B. 451, H-1372. Tel.: (36-1) 1329-571, or fax: (36-1) 1531-406.

September 4-8

18th Biennial Conference of the New Zealand Dental Association — Tomorrow's Dentistry Today in Rotorua, New Zealand. Contact the NZDA Conference Secretary, Dr. Roger Ayers, 19 Pukaki St., Rotorua, New Zealand. Tel.: +64 7 348 5385, or fax: +64 7 348 6788.

September 20-22

Australian Academy of Dentomaxillofacial Radiologists — 1996 Scientific Meeting in Gold Coast, Australia. Contact Dr. Ross Macdonald, 195 North Terrace, Adelaide, South Australia, 5000. Tel.: 61-8-(08) 223-2559, or fax: 61-8-(08) 223-2517. E-mail Internet: 100236.1444@CompuServe.COM

September 28 - October 1

FDI 1996 — 84th World Dental Congress in Orlando, Florida. Contact Laura Stephenson. Tel.: (613) 523-1770 ext. 246 or 1-800-267-6354.

October 4-5

4th International Congress on Esthetic Dentistry (CIDE 96) in Paris, France. Organized by the French Society of Esthetic Dentistry with simultaneous translation French/English. Contact the French Society of Esthetic Dentistry, 33 rue de Prony, 75017 Paris, France. Tel.: 33 1 42 27 31 78, or fax: 33 1 47 64 14 25.

October 5-8

International Conference on Stress and Health — ISMS 6 in Sydney, Australia. Contact F.J. McGuigan, Institute for Stress Management, 10455 Pomerado Rd., San Diego, Calif. 92131. Tel.: (619) 635-4698, or fax: (619) 635-4669. Internet: NOSTRESS@sanac.USIU.edu.

November 27-30

5th Pakistan International & 18th National Dental Conference in Karachi, Pakistan. Contact the Col-

lege of Dental Surgery, Liaquat Medical College, Jamshoro, Hyderabad, Sindh, Pakistan.

December 6-7

Symposium — 20 Years in Periodontal Local Drug Delivery: Current Applications and Future Trends in London, U.K. Contact the Conference Manager (Dental), The Medicine Group (Education), 62 Stert St., Abingdon, Oxfordshire, OX14 3UQ, U.K. Tel.: + 44 1235 555770, or fax: +44 1235 554691.

CANADA



August 16-17

6th Annual Meeting — Atlantic Provinces AGD, Digby Pines resort, Nova Scotia. Contact Dr. Alex Fischel (902) 825-4837, or Dr. Jack Thompson (506) 847-4243.

August 17-20

Canadian Dental Association 1996 Convention in Montreal. Contact Laura Stephenson. Tel.: (613) 523-1770, ext. 246, 1-800-267-6354, or fax: (613) 523-3062.

August 17-20

Annual Convocation and Meeting of the Canadian Section of the International College of Dentists in Montreal, Que. Contact the Canadian Section of ICD, 12A Yonge Blvd., Suite 1, Toronto, Ont. M5M 3G5.

August 17-22

8th World Congress on Pain in Vancouver, B.C. Sponsored by the International Association for the Study of Pain (IASP). Contact the IASP Secretariat, 909 N.E. 43rd St., Suite 306, Seattle, Wash. 98105, U.S.A. Tel.: (206) 547-6409, or fax: (206) 547-1703.

August 18

Alumni Reception for Dalhousie DDS and DH Grads during the CDA Convention in Montreal. The reception will take place in the Portage Room of the Montreal Bonaventure Hilton from 3:30 to 4:45 p.m.

September 7

Putting Patients At Ease in Sydney, Nova Scotia. Presenter: Dr. A.E. MacLeod. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

September 7-8

Royal College of Dentists of Canada Convocation, Annual Dinner and Annual Meeting in Montreal, Que. Contact Kay Montgomery. Tel.: (416) 929-2722, or fax: (416) 929-5924.

September 21

Oral Medicine For The Health Provider: Diagnosis and Treatment of Oral Diseases Secondary to Immunosuppression and Cancer Therapy. Presenter: Dr. Francina I. Lozada-Nur. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

September 26-28

4th Annual Scientific Meeting of the Canadian Academy of Restorative Dentistry and Prosthodontics — "Perfecting the Art and Science" in Vancouver. Contact Dr. J. Ivan Johnson, 200-1544 Marine Dr., West Vancouver, B.C. V7H 1H8. Tel.: (604) 922-7040.

October 2-6

32nd Annual Meeting of the Canadian Academy of Endodontics in Kelowna, B.C. Contact Dr. W.J. Froese. Tel.: (604) 763-0855, or fax: (604) 763-1124.

October 3-5

Canadian Association of Orthodontists Annual Scientific Session, in Toronto, Ont. Contact Diane

Gaunt. Tel. (416) 491-3186, or fax: (416) 491-1670.

October 4-5

Nitrous Oxide Conscious Sedation. Presenter: Dr. David Donaldson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 5

Computers in Dentistry. Presenter: Mr. William Hiltz. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 11-12

International Conference on Computer Applications in Dental Practice and Education at the University of Montreal. Contact Dr. Arto Demirjian, Faculty of Dentistry, University of Montreal. Tel.: (514) 343-6072, or fax: (514) 343-2233.

October 19

Contemporary Restorative Dental Materials in Wolfville, Nova Scotia. Presenter: Dr. Terry Donovan. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 25-26

Thompson Okanagan Dental Society Annual Meeting and Convention in Kelowna, British Columbia. Contact: Lane Shupe. Tel./fax: (604) 764-2247.

November 1-2

Southern Ontario Surgical Orthodontic Study Group will meet in Windsor. Contact Dr. Jeff Berger. Tel.: (519) 258-2632, or fax: (519) 258-2637.

November 2

Treatment Planning Crowns And Bridges For Our Aging Population. Presenter: Dr. Joseph A. Clayton. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S.

B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 15-16

Dental Update '96. Coordinator: Dr. Andrew Thompson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 30

Medical Emergencies In The Dental Office. Presenters: Dr. Reginald Godday and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

January 11, 1997

Temporomandibular Joint Diseases, Facial Pain. Presenter Dr. A.K. ElGeneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

U.S.A.



September 5-6

Second Annual Conference on Geriatric Oral Health — Dentistry and Drugs in the Elderly — in Ann Arbor, Michigan. Contact the Office of Continuing Dental Education, University of Michigan. Tel.: (313) 763-5070.

September 25-27

Call for abstracts for the **59th Annual Meeting of the American Association of Public Health Dentistry** in Orlando, Florida. Deadline for submission was May 1, 1996. Contact the AAPHD National Office, 10619 Jousting Lane, Richmond, Va. 23235-8344. Tel.: (804) 272-8344, or fax: (804) 272-0802.



November 4-5

American Board of Oral and Maxillofacial Radiology — 1996 Certifying Examination in San Diego, California. Application deadline was May 3, 1996. Contact Dr. R. Curtis Lundeen, Oral Radiology, Oregon Health Sciences University, School of Dentistry, 611 S.W. Campus Dr., Portland, Ore. 97201-3097. Tel.: (503) 494-8930.

June 21-27, 1997

International Association of Dento Maxillo Facial Radiology in Louisville, Kentucky. Held in association with the **3rd International Congress on Computed Maxillofacial Imaging**. Contact Dr. Neill Serman, Division of Oral Radiology, School of Dental and Oral Surgery, Columbia University, 630W 168 St., New York, N.Y. 10032. Tel.: (212) 305-5674, or fax: (718) 601-6836.

DENTAL MEETINGS



August 16-17

Annual Meeting of the CDA Board of Governors, in Montreal. Contact Suzanne Burton. Tel. (613) 523-1770, ext. 201, or 1-800-267-6354.

August 17-20

CDA 1996 Convention in Montreal. Contact Laura Stephenson. Tel.: (613) 523-1770, ext. 246, or 1-800-267-6354, or fax (613) 523-3062.

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BOARD OF GOVERNORS

NOTICE OF MEETING

Annual Meeting

The Annual Meeting of the Board of Governors of the Canadian Dental Association will be held August 16 and 17, 1996 (Friday and Saturday), at the Bonaventure Hilton Hotel, Montreal, commencing at 9:00 a.m.

It is brought to your attention that meetings of the Board of Governors are open to all members of the Association.

The Board is composed of twenty-seven governors with voting privileges and a Chairman. Governors represent members across Canada on a 1 to 500 ratio. The Canadian Forces Dental Services, Student members and Affiliate members from Quebec are represented by one member each.

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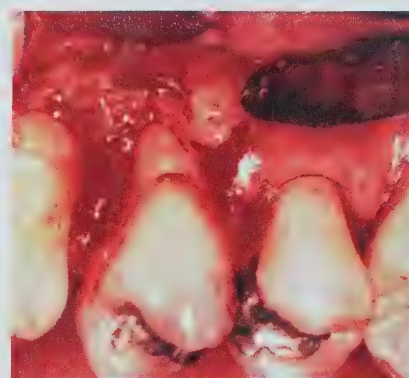
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† "Listerine helps reduce gingivitis (minor inflammation of the gums caused by plaque above the gumline) when used in a conscientiously applied program of oral hygiene and dental care." CANADIAN DENTAL ASSOCIATION †Gingivitis was evaluated using the Modified Gingival Index

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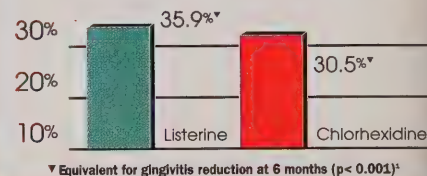
1. Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. J Clin Periodontol 1990;17:575-579

2. Data on file, 1995

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C Journal

Vol. 62, No. 8 • August / Août • 1996



Periodontal Diseases Affecting Children and Young Adults /
Les maladies parodontales touchant les enfants
et les jeunes adultes

Lip Cancer /
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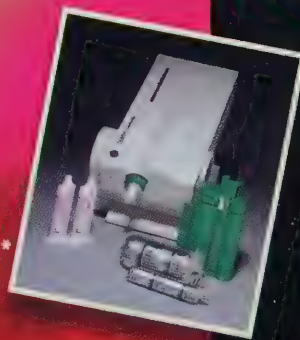
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Canadian Dental Association/
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AUGUST / AOÛT 1996
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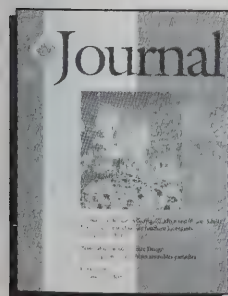


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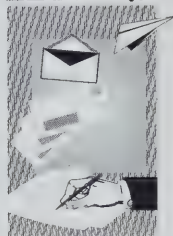
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LETTERS



Editor's Note

Although *Journal* policy is to publish letters in the language in which they are received, the editor reserves the right to translate letters which contain items of particular interest to the profession as a whole. Therefore, we are pleased to present a translation of the following letter.

The Future of Dental Education

It is with pleasure that I have witnessed, over the last few months, the growing debate concerning the future of dental education in Canada (President's Column, June 1996). At the dawn of the 21st century, it seems healthy to me that dentists are questioning themselves on the role of their profession among the multiple health professionals as well as on the training of their future replacements.

Just like the CDA's Task Force on Dental Education, I believe that the status quo is unacceptable and that

a major reform of dental education is necessary. However, I do not believe that the integration of faculties of dentistry with faculties of medicine should be feared. On the contrary, I find this possibility desirable.

I recently completed the last two years of the medical program at Laval University that are required within Laval's maxillofacial surgery program. Therefore, I was able to see to what extent dentists, through their traditional training, have voluntarily isolated themselves from the world of health professionals. Though we might have maintained our independence as a profession, as well as certain research budgets, we are still not considered to be the professionals of choice when it comes to diagnosing and treating oral and maxillary lesions, by either patients, who prefer to consult their doctors, or by health professionals, who refer to otorhinolaryngologists.

I believe that we deserve this fate to some extent. In fact, because we want our independence too much, our chauvinism has led us, in some universities, to leave the teaching of certain clinical sciences to dentists rather than to more qualified medical specialists. The result distresses me: a young dentist suffers from clearly insufficient basic medical training and does not compare to any "specialist" worthy of the name. We cannot pretend that we are medical specialists because we have never treated the sick and have learned our differential diagnostics from books alone.

The existing dental education system may be a good one if we want to train technicians capable of removing caries, filling teeth or providing dentures. But to call ourselves oral and maxillary lesion specialists, we have to prove our competence, starting with valid medical training. The integration of our faculties with faculties of medicine would be a step in the right direction and, at the same time, it would ensure better visibility for our profession on the part of other health professionals.

One day, I hope, our title of Doctor will be more than just a historically acquired one ...

*Robert Paquin, DMD
Pediatric dentist and senior
resident, maxillofacial surgery
Laval University
Quebec, Quebec*

Infection Control

Bravo to Dr. Rella P. Christensen for her article in the June issue, Infection Control Procedures — Who Should Decide What Cannot Be Used?

*Lee Erickson, B.Sc., M.C.I.D., DDS
Dartmouth, Nova Scotia*

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Dial 1-800-Galileo read the ad on page 379 of the May '96 issue of the *Journal*. At first glance I wasn't sure where this would lead but was assured further on that I would find "truth is better."

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I think the *Journal* staff should be as selective with which ads they publish as they are with editorial and scientific material.

*William McJannet, DDS
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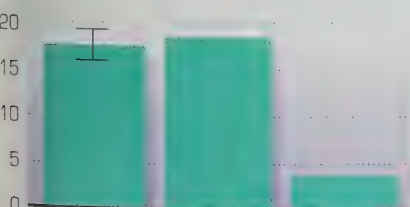
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sem, M., Davidson, C.L., Vanherle, G., Van Doren, V., Lambrechts, P. "The Relationship Between Test Methodology and Elastic Behavior of Composites", J Dent Res, 66(5): 1036-1039, May 1987
mp-Schulte, C.M., Davidson, C.L. "Complete Marginal Sealing of Class V Resin Composite Restorations Effected by Increased Flexibility", J Dent Res 69(6): 1240-1243, June 1990
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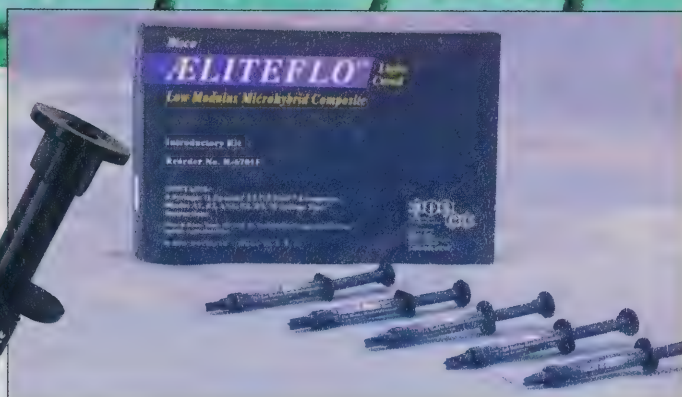
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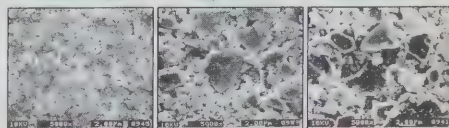
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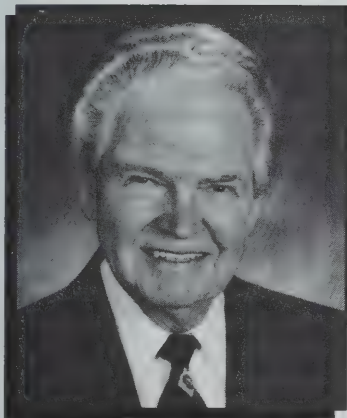
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EDITORIAL

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Dr. P. Ralph Crawford,
Editor

During the past few weeks, CDA staff have received an unusual number of phone calls from people with problems. At times I feel more like Ann Landers than the editor of a scientific journal. Let me relate a few instances and allow you, the reader, to ponder whether or not I have said the right things to complete strangers.

I sometimes receive calls from patients who would like me to give them a dental diagnosis over the phone. In one particular instance, a lady from Quebec told me that she had a loose gold crown and when she went to her dentist, "He told me that all crowns are loose and I shouldn't worry about it." Having no idea of the state of her crown, her tooth or her general dental condition, I suggested that perhaps she should see another dentist. She quickly replied that she can't afford a visit to another dentist, and, besides, she likes her dentist and doesn't want to switch. Calls like that are difficult because there is obviously a communication problem. In this case, I tried to persuade the patient to have an-

other talk with her dentist. However, I'm still not sure that she was convinced to do so, or that I even remotely helped her.

In another case, a gentleman was very confused about his dentist's recommendation for implants. It seems that the patient isn't happy with his complete dentures so his dentist suggested implants. While most callers express concern about the costs associated with the various procedures, this patient was concerned that, "The dentist wants to open up my gums and screw things into the bone." Fortunately, the caller mentioned the dentist's name during our conversation. Since I know her to be a kind and compassionate individual, I intervened by making a quick call to her office. She admitted that perhaps the day of the patient's visit had been particularly hectic, and that the treatment plan for implants had probably been rushed — there is that communication word again. Unlike the call about the loose crown, this time I felt as though I had accomplished something — the patient was promptly re-scheduled for an appointment to give him more detailed information about implants.

Generally, calls that come from dentists are more stressful than those that come from the public — the public tends to have dental problems, whereas dentists tend to have people problems. For example, a dentist from Alberta read an editorial about fraud and subsequently became concerned that a colleague in his town was cheating insurance companies by not collecting co-payments. He called my office with a plea: "What should I do about it?" I offered two possible solutions — either call the dentist and openly discuss the problem, or call the licensing authority for advice — but he didn't consider either option to be acceptable. He didn't particularly like the dentist and seldom spoke to him, and he didn't want to get involved with a registrar because he didn't want to reveal his own name. I'm not sure why he called the *Journal*, but it sounded like a case of anguished conscience to

me. I offered to send him a copy of the CDA Code of Ethics and suggested that he would have to make up his own mind and live with his decision.

Another call was similar to ones that I often receive. It came from a dentist who had just seen a patient for the first time and suspected that the patient's former dentist was practising supervised neglect. In this case, despite the fact that the patient reported a regular recall program, the dentist noticed open margins, caries and periodontal problems. He asked me: "Now what do I do?" As with the cheating co-payment case, I suggested that he call the former dentist — perhaps there were extenuating circumstances that the patient didn't reveal. This caller was also reluctant to make direct contact with the dentist. Sometimes there isn't enough courage to calm a conscience. J.F. Clarke, a 19th century American theologian, stated it best: "Conscience is the root of all true courage; if a man would be brave let him obey his conscience."

These calls, and numerous others that are received by dental associations across the country, are indicative that the four Cs — communication, conscience, common sense and courage — trouble all of us. They are truly human problems. And in this day of miracle electronics, not one of them can be handled well by voice mail, fax machine or the Internet. My sincerest hope is that concerned individuals continue to place calls, and that the people who answer those calls impart yet another C — comfort. Henry Fielding, the literary giant of the 18th century who helped launch the English novel tradition, gave some good advice about comfort: "Giving comfort under affliction requires that penetration into the human mind, joined to that experience which knows how to soothe, how to reason, and how to ridicule, taking the utmost care, not to apply those arts improperly."

*P. Ralph Crawford, BA, DMD
Editor of the Journal of the
Canadian Dental Association*

Journal

August/
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Vol. 62
No. 8

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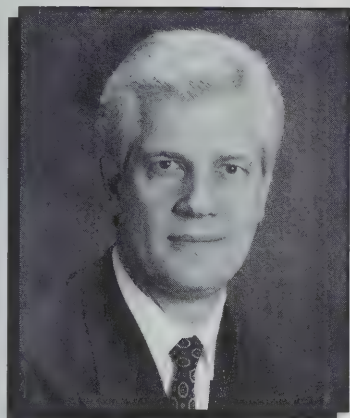
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PRESIDENT'S COLUMN

ONE GREAT YEAR



Dr. James R. Brookfield,
CDA president.

In 1971, when I began my involvement in organized dentistry, I never imagined that I would ultimately become the president of the Canadian Dental Association. Today, in the last days of July, it's hard to imagine that my term of office is nearly over.

It's been a good year, even a wonderful year, but 365 days have never gone by so quickly. Between the travel, the meetings, and keeping things afloat on the home front, I've never lived through a more intense period in my life, my practice, or my profession.

Dentistry faced some extremely difficult issues in 1995-96. Managed care pushed its way into Canada. Dental plans were threatened by taxation — yet again. Amalgam was back in the news. Fluoride came under fire. Budget cutbacks resulted in changes to the federal government's dental programs for both Native Canadians and veterans. Oralife was born.

Although many of these issues are still on the table, CDA and our provincial partners made considerable progress toward their ultimate resolution. We didn't do it alone. Every dentist who participated in dentistry's national campaign against the taxation of dental benefit plans, or who took the time to discuss the ins and outs of managed care, amalgam safety, or fluoride with their patients, deserves some of the credit for the success we enjoyed this year. It was a team effort.

I'm proud of what we achieved, and doubly proud that I was selected to captain dentistry's 1995-96 team. It's been a wonderful experience, one that I'll never forget.

I'd like to thank the members of my management committee, my executive council, the staff of CDA, and you, the dentists of Canada, for making it possible.

Working together, we preserved the tax-free status of employer-sponsored dental plan premiums for at least one more year. We brought the voices of science and reason back to the amalgam debate. And we created a mechanism to manage managed care.

Equally important, we established a new direction and a new organizational structure for CDA. They were difficult decisions, but by recognizing that issues management and information make up CDA's core business, and by eliminating our product merchandising program, we have well-positioned the association for the future.

With the addition of Mr. James Gagnon to CDA's staff, as the director of our new practice management support services department, and the hiring of Lise Lalonde as manager, government relations, we now have the resources in place to move ahead quickly and effectively in several key areas.

James' knowledge of the insurance industry will be critical to our successful management of the dental benefits and managed care issues. Similarly, Lise's past experience on Parliament Hill will add a new dimension to CDA's government relations activities, and help us to plan effective strategies.

The other highlight of the year, and possibly the most important, was the renewed spirit of cooperation between CDA and our provincial partners. Ontario played a key role in the development and implementation of CDA's successful MP-Dentist Contact Program. Quebec worked hand-in-hand with us to increase membership in the national association, and to link the Dentaide and the CDAnet electronic data interchange systems. And all 10 provinces participated in CDA's successful campaign against the taxation of employer-sponsored dental benefit plan premiums.

Another key initiative involved Dr. Derek Jones of Nova Scotia. Working closely with Mr. Brian Henderson, CDA's associate executive director, he assembled the international panel that critiqued — and refuted — the so-called Richardson report, "Assessment of Mercury Exposure and Risks From Dental Amalgam." The panel's work was instrumental. Its conclusions were clearly reflected in the consensus position and eight policy recommendations reached by the stakeholders committee that reviewed the Richardson Report on behalf of Health Canada, and in CDA's recently-revised (pending board approval) dental amalgam patient sheet.

The stakeholders committee recommendations will likely form the basis of Health Canada's much-anticipated new policy on dental amalgam, which was scheduled for release at the end of July.

I'm also particularly proud to have been involved in the creation of CDA's new Public Education Program and our ad hoc committee for new dentists.

It's hard to step aside when you're the leader of a winning team. And it will take some time to adjust. But when the captain in waiting has the knowledge, insight and skill of CDA's incoming president, Dr. Barry Dolman, you know that the team will continue to excel.

This is my last column as CDA president. I'd like to end it by thanking, once again, the key members of my 1995-96 team for their contribution and support: president-elect Dr. Barry Dolman; vice-president Dr. Toby Gushue; the members of my executive council; executive director Jardine Neilson and CDA's senior staff group; the CDA staff; and you, the dentists of Canada.

If there's one thing I've learned after more than 20 years of involvement with the Ontario Dental Association and CDA, it's this: when dentistry is united, and individual dentists, the provinces and CDA all work together as a team, things happen.

James R. Brookfield, DDS
President of the Canadian
Dental Association

Journal

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No. 8



Self Learning / Self Assessment Quiz 1995/96

The questions and answers to the SLSA Quiz appear below. The Quiz was published in the June issue of the *Journal* to allow dentists to personally assess the knowledge they gained through their participation in the SLSA Program during 1995-96. The names of all dentists who returned their completed Quiz response card to CDA's national office prior to August 10, 1996 will be forwarded to their respective provincial licensing bodies for consideration. All 10 provincial licensing bodies currently recognize the SLSA Program. However, the number of continuing education points awarded by each licensing body for participation in the SLSA program may vary. Dentists should contact their provincial licensing body for more information. The SLSA Program will resume with a new set of 40 questions, answers, rationales, and sets of references in September.

QUESTION 1

In a deep Class II cavity preparation, "hybridization" of dentin is a restorative treatment by which

1. a resin impregnated layer is formed in the dentin.
 2. dentinal tubules are sealed.
 3. dentinal fluid flow is prevented.
 4. the need for a base is eliminated.
- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above.

ANSWER: E

QUESTION 2

Multiple microcracks and fine fracture lines

1. are found on occlusal surfaces of composite resin restorations.
 2. account for more occlusal wear.
 3. may be sealed with a low viscosity sealant.
 4. increase staining.
- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above.

ANSWER: E

QUESTION 3

In restorative dentistry, in a deep cavity preparation for an amalgam restoration, recent studies have shown that unbased restorations

1. are stronger.
2. are weaker.

3. have increased longevity.
 4. have decreased longevity.
 5. have decreased tendency to fracture.
- A. 1 and 3
B. 2 and 4
C. 1, 3, 5
D. 3 only
E. 5 only.

ANSWER: C

QUESTION 4

Removal of mandibular third molars will prevent incisor crowding.

- A. True
B. False

ANSWER: B

QUESTION 5

When a cement base is required for thermal insulation the minimum thickness should be

- A. 0.5 mm
B. 1.0 mm
C. 2.0 mm
D. 3.0 mm

ANSWER: C

QUESTION 6

Which of the following influence the effect of a drug in an elderly patient?

1. Increased pH of the gastro-intestinal tract.
2. Increased absorbing surface of the gastro-intestinal tract.
3. Decreased gastro-intestinal mobility.
4. Decreased kidney excretion.

5. Decreased liver function.

- A. 1 and 3
- B. 2 and 4
- C. 3, 4, 5
- D. 1, 3, 4, 5
- E. All of the above.

ANSWER: D

QUESTION 7

After the age of 20, the likelihood of mandibular third molar eruption is increased if the following radiographic features are present:

- 1. the impacted tooth is vertical.
- 2. the impacted tooth is in soft tissue.
- 3. the impacted tooth is at the same occlusal level as the second molar.
- 4. if sufficient space exists between the ramus and the second molar.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: E

QUESTION 8

Calcium hydroxide as a liner

- 1. adheres to vital dentin.
- 2. cannot seal vital dentin.
- 3. stimulates pulpal fibroblasts to form reparative dentin.
- 4. is a poor insulator.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: C

QUESTION 9

You have decided to prescribe erythromycin for a patient. Which of the following drugs should not be taken in conjunction with this antibiotic?

- 1. Ibuprofen
- 2. Acetylsalicylic Acid (Aspirin)
- 3. Codeine phosphate
- 4. Terfenidine (Seldane)

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: D

QUESTION 10

A composite resin may be used successfully for a mesio-occlusal restoration on a maxillary second premolar when

- 1. esthetics is important.
- 2. centric stops are located on sound enamel.
- 3. butt-end joints between the tooth and the composite resin can be provided.
- 4. the bucco-lingual width of the cavity preparation is not greater than one third of the intercuspal width of the tooth.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: E

QUESTION 11

Osteoporosis is a condition which

- 1. is referred to as the "silent disease".
- 2. can occur in women at all ages.
- 3. may result in early tooth loss.
- 4. does not create prosthetic problems.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: A

QUESTION 12

Oral Penicillin V is still considered the antibiotic of choice for the treatment of odontogenic infections because

- 1. it has low cost.
- 2. peak serum levels are obtained within 15 minutes.
- 3. it may be taken with food.
- 4. it does not cause any sensitivity reaction.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

ANSWER: B

QUESTION 13

In the anterior region of the maxilla forced eruption of a tooth is preferable to surgical lengthening of a crown because

- 1. it reduces plaque control problems.
- 2. the esthetic result is improved.
- 3. it does not result in pulpal complications.

4. the gingival margin is harmonious with adjacent teeth.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above.

ANSWER: C

QUESTION 14

Bonded amalgam when compared to conventional amalgam

1. will reduce the incidence of cuspal fracture.
2. will allow for a more conservative cavity preparation.
3. will decrease marginal leakage.
4. is better accepted biologically.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4
D. 4 only
E. All of the above

ANSWER: E

QUESTION 15

Following loading of an implant the patient should

1. be instructed in specific oral hygiene methods.
2. use chlorhexidine mouthwash.
3. have a regular regimen of maintenance oral hygiene visits.
4. have periodic radiographic evaluation of bone levels.

- A. 1, 2, 3
B. 1 and 3
C. 2 and 4

- D. 4 only
E. All of the above

ANSWER: E

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Bisco, Colgate, the Fowler-Pearce Partnership (ScotiaMcLeod), Nobelpharma, and Sci-Can.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education credits required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education credits.

Funding for the SLSA program has been provided by:

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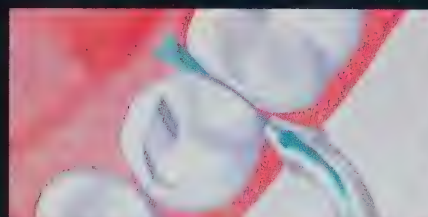
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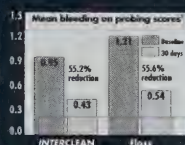


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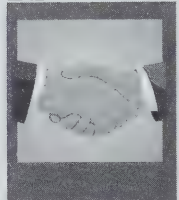


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Between Us and Our Patients

David Somer, DDS

Over the past two months, dentistry has come face to face with one of the most powerful marketing tools in existence — the daily press.

If nothing else, the media's recent interest in managed dental care and Oralife has given us a good indication of the challenges that lie ahead, and of why dental benefits issues are of paramount importance to both individual dentists and the dental profession.

In my July column, I wrote about marketing and the need to sell our patients on the value of dentistry. Unfortunately, as recent articles put out by the *Toronto Star* and *Canadian Press* make only too clear, we aren't alone in the battle to win the teeth and minds of Canadians. Managed care is already gaining a foothold in Canada, and its promoters are pushing hard to increase its share of the dental market through every means at their disposal.

An article put out by *Canadian Press* is of particular concern. Picked up by a number of daily papers in early July, it reported on the findings of what was billed as the First Annual International Consensus Conference on Dental Risk Assessment and Disease Management.

The problem, from dentistry's perspective, is that the article was full of misinformation on the one hand, and a testimonial in support of Oralife and its treatment approach on the other. It began by advising "dentist chair cowards" to "take heart," because "a new philosophy on tooth decay could save you from those whining drills and medieval-looking tools."

After correctly stating the conference conclusions — that tooth decay and gum disease are infectious diseases caused by bacteria and other

microbes, and that both can be prevented in many people through the use of fluorides, antimicrobials, antibiotics and other non-invasive treatments — the article then goes on to state: "That's sure to bring a big toothy grin to everyone remotely familiar with traditional treatments like fillings, extractions and — ouch! — gum surgery."

The comments on dental pain are followed immediately by a quote from Dr. Richard Ten Cate, the chairman of Oralife Group Inc. and a former dean of the faculty of dentistry, University of Toronto, which states: "The consensus from this meeting will establish the gold standard for dentistry."

What the article fails to mention is that the approach now being advocated by Oralife — which involves a combination of new diagnostic techniques and preemptive therapies — is in no way a departure from dentistry's existing philosophy and mode of practice. Prevention, not treatment, has been the profession's primary goal ever since I've been in practice, and we've achieved remarkable success. We've also kept the costs of preventive dental services below the Consumer Price Index (CPI).

In fact, the key to dentistry's success as a profession has been the combination of preventive measures such as the fluoridation of toothpaste and municipal water supplies, innovative dental awareness programs, and the trusting, caring relationship that dentists have with their patients. If dentistry is to continue to survive as a strong and viable profession, and to provide optimal oral health care to our patients, maintaining this relationship will be vital.

In fairness to the author of the article, he (or she) also interviewed Dr.

Hardy Limebeck, who called the conference consensus "a start," and said that dentistry must still "come up with an appropriate diagnostic criteria and appropriate preventive treatment." He also warned that the new approach to dentistry will not wipe out tooth decay, and that people who eat a lot of sugar, and those with naturally weak teeth, will still be at high risk.

But the damage — from dentistry's perspective — was already done.

As I stated in July, the key to effective marketing is knowing where you're starting from. If you're going to change people's attitudes in a desired direction, and get a sense of how effective your marketing campaign is, you have to be able to evaluate not only how people's attitudes have changed as a result of your initiatives, but also how much they have changed.

It's therefore useful — if not essential — to keep a close watch on what the public and the media are saying about our profession, and their perceptions of how the delivery of dental care is (or should be) changing.

Two recent *Toronto Star* articles come to mind. The first piece describes the dental plan provided by Local 75 of the Hotel and Restaurant Employees Union. It explains that the plan costs the Toronto-based union local much less than an equally generous conventional dental plan would, even though there are no co-payments, no dollar maximums, no time limits between visits, and only two excluded treatments. The catch is that union local members must visit a specific dental clinic, which is owned and operated by the local through a board of trustees.

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In the clinic, dental services are provided to union local members by a team of salaried dentists, dental hygienists, dental assistants and a part-time denturist. There is no provision in the union local's plan for its members to opt out and visit a dentist of their choice.

The article focuses on the attitudes of one specific patient, who stated that she was happy with the dental services she received at the clinic, and that she believed the union local's current dental plan is better than the alternatives — reducing the amount of coverage or requiring patients to pay a greater share of the costs.

This belief goes against our own data, which indicate that the majority of Ontario patients place a high value on being able to choose their own dentist, and that many have a close, long-standing relationship with their dentist. But even if the attitude of the patient interviewed in the article is atypical, it may be a sign of things to come. In other words, unless we work hard to keep patients informed and establish a good relationship with them, we could see the freedom of choice issue becoming less important over the next few years.

The second article — titled "Wired firm aiming to reshape company's plan will use bacteria test and Internet to fight cavities" — is based primarily on an interview with Mr. Ross Perry, the president of the Oralife Group.

Mr. Perry's company is promoting a dental plan that will supposedly contain the costs of dental services by designating patients as being high risk, medium risk, or low risk for dental caries and periodontal disease. The concept involves dentists using bacteriological testing to determine the patient's risk group, and then sending this information to the company on-line through the Internet. Once the information is analyzed by the company, dentists will receive a patient report card that will establish the frequency of recall check-ups and suggest a regimen of treatment for the patient.

Oralife is currently attempting to contract out their services to the insurance companies that administer third-party plans on behalf of Canadian employers, based on the promise that it can hold the line on the cost of dental services at the outset, and ultimately generate significant cost reductions for employers. The Oralife approach, as described in the

article, will depend on insurance companies, plan administrators and dentists buying into the company's line of testing and pharmacological products.

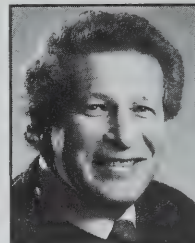
Clearly, from the public's perspective, the idea that a topically-applied product — in conjunction with a proper diet and good home care — can prevent dental caries and periodontal disease must hold considerable appeal. And while dentistry can claim a lack of significant clinical trials among all patient groups, and that Oralife's products will only truly benefit a small number of patients, Oralife's marketing pitch will be hard to fight.

I don't know about you, but I'm not ready or willing to have a computer program, operated by an outside company, determining treatment plans for my patients. Do we really want "Big Brother" to enter the dental profession?

So where does this leave us, the dentists of Canada, who are ultimately responsible for providing oral care to Canadians on a day-to-day basis? From my perspective, we are still the most significant stakeholder

group (outside of our patients) when it comes to the provision of optimal oral health care. As dentists, we obviously have a huge stake in these and other dental benefits issues, including the taxation of dental plan premiums. Both we and our provincial and national

dental associations have a lot of hard work to do if we are going to direct patients' attitudes in the direction we want them to go. It won't be easy. If we are going to succeed, every dentist in Canada will have to join together with their colleagues, and do their utmost to preserve the positive, caring relationship that we currently enjoy with our patients. ■



Dr. David Somer maintains a private dental practice in Hamilton, Ontario. He is a member of CDA's executive council and the chairman of the CDA steering committee on dental benefits issues.



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ISBN: 0-8016-7963-X

Dr. Frank Weine should be well-known to most *Journal* readers. During his many years as an endodontist-educator, he has published several clinically-oriented articles in these pages, as well as in other journals. He has also presented lectures on endodontics for more than 30 years, and has been a lecturer at the CDA Convention. Therefore, even those who have not yet read this text may still be familiar with Dr. Weine's informative, challenging and stimulating method of presentation.

Even though it is a fifth edition, this book contains more than material from an "out of date" technique; each new edition has been continually updated since *Endodontic Therapy* first appeared more than 25 years ago. As Dr. Weine states in the preface, somewhat facetiously I hope, "when any former dental student looks back on his or her endodontic education, it appears that just about everything that was taught prior to 1970 was totally wrong. If a clinician who graduated before that time is uncertain about the correct course of therapy in a specific case, it may be best to think of what was taught in school for this condition and then do exactly the opposite in order to gain the best results."

There have been many changes in concepts and procedures in the field of endodontics over the past 30 or more years. Some of these changes, often advocated by Dr. Weine himself, are reflected in the earlier editions and expanded upon in this current text. For example, there is a shift away from the use of silver points in curved canals and a change to a preparation technique which will better accommodate the ob-

turation of canals with gutta percha as a solid core material. Although the fifth edition depicts examples of long-standing successful cases which used silver points, a new section has been added to explain the most common reasons for failed cases and how to retrieve these solid core materials that have failed over time.

The chapter "Intracanal Treatment Procedures, Basic and Advanced Topics" describes the "zip" and "elbow" which may be inherent in a curved canal preparation shape. These terms appear in an article which was first published by Weine, Kelly and Lio. The precurved instruments and half-size files that they advocate are also innovations that have been introduced into an endodontic regimen. The numerous clinical examples in this chapter help to demonstrate the extra care and attention needed to treat the fine, tortuous canals which formerly confounded the general practitioner.

Discovering canal anatomy is perhaps one of the most critical stages of endodontic treatment and is covered in the chapter on access cavity preparation. Weine was one of the first clinicians to describe the multiple canal system as found in the mesiobuccal root of the maxillary molar that was later recognized to exist in numerous other teeth in both arches. In this text, Weine describes a simplified classification of four types of double canal anatomy found in these roots. He then discusses the incidence and shows strategies for adequately preparing a multiple canal system so it can be obturated with a dense, lateral condensation filling. Again illustrated by clinical examples, the importance of understanding the internal anatomy is stressed in both initial treatment and in the re-treatment of failing cases.

Calculation of working length is a subject that is often taken for granted in some texts. Weine now treats this subject as a separate chapter and, true to his style, he gives his clinical experience of

how methods of establishing a working length have changed over the years. He explains why using radiographic images or arbitrary points to position the apical foramen may lead to errors. Keeping up with the advances in techniques and using the innovative technology of the electronic apex locator, he provides step-by-step explanations of how to use the Sono-Explorer developed by Dr. N. Inoue. Weine admits that he does not have enough experience with the third generation apex locators that can be used in the presence of conducting irrigants, but states that they are also reliable and accurate.

There is much else to recommend in the latest edition of this text, some of which may be controversial. However, most of what is covered will be useful to clinicians. As long as the technology of endodontic treatment keeps evolving, the need for new editions of informative texts by clinically-oriented educators will increase.

Reviewed by:

William H. Christie, DMD, MS,
FRCD(C)

Associate professor, department of restorative dentistry, faculty of dentistry, University of Manitoba.

The American Society of Anesthesiologists 1995 Annual Refresher Course Lectures

edited by Paul G. Barash

1995, Lippincott-Raven Publishers:
Philadelphia, and The American Society of Anesthesiology: Illinois
\$25 (Cdn.)

ISSN: 03-63-47-1X

This soft-covered text contains the didactic portion of the "Annual Refresher Course Lectures," given at the American Society of Anesthesiologists Annual meeting. In 1995, the meeting was held in Atlanta. Each year, this book is eagerly awaited by most in the an-

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1996
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No. 8

esthesia community and has often been described as "the only book you need to buy" to keep current on the subject.

This book is unique in that it is initially indexed according to subject. Some 20 major chapters cover a total of 100 individual articles. For example, the heading "Airway Management" covers four articles, and "Cardiovascular System," covers 17 articles. The breadth of subject matter in these chapters is exhaustive. In addition to the above-mentioned, other subjects of particular interest include: anesthesia techniques, outpatient anesthesia (17 articles), pediatric anesthesia, pharmacology, preoperative preparation and postoperative management. Chapters on all body systems — particularly as they apply to anesthesia — are also included. The book is further alphabetically indexed according to the author's surname.

Regular readers of this annual publication will find that several articles are repeated from previous years (often several previous years). The repeated articles almost always contain updated material when necessary. Most readers welcome the repetition, however, as it serves to reinforce major concepts.

The 100 individual articles (covering some 700 pages) are all referenced — if not directly in the body of the text — within a very complete and always up-to-date bibliography that follows each article. The volume covers additional subjects of particular interest to the dentist or oral and maxillofacial surgeon involved in outpatient anesthesia. The article entitled "Anesthesia for the Pregnant Patient Undergoing Non-Obstetric Surgery," provides an excellent discussion of the evidence (or lack thereof) for the toxic effects of nitrous oxide. Similarly, the article "Awareness During Anesthesia," contains a referenced discussion of the potential benefits of intra-operative suggestions found by several authors in reducing nausea, post-operative pain, improving wound healing and promoting

earlier ambulation. In fairness, the author also offers references in which other investigators failed to confirm these beneficial effects of therapeutic suggestions.

The list of valuable information within this text is almost endless. At two hours a day, it took me two months to read this book from cover to cover — and that's after 12 consecutive years of practice. The only flaws in this book are frequent typographical errors, and non-uniform letter size from one article to the next. At times, the reader almost needs a magnifying glass. However, this inconsistency is not unexpected in a book of this type and in no way detracts from its content.

This very valuable book is not readily available in medical bookstores, although it can be found in many libraries. The interested purchaser is best advised to contact the American Society of Anesthesiologists in Park Ridge, Illinois for a copy. Smaller more elaborate versions containing about 20 of the original articles are available from Lippincott-Raven Publishers.

Reviewed by:

Earle R. Young, B.Sc., DDS,
B.Sc.D., M.Sc., FADSA
Associate professor and head,
department of anesthesia, faculty
of dentistry, University of Toronto
and Wellesley Hospital, Toronto.

Complete Dental Bleaching

by Ronald E. Goldstein and
David A. Garber

1995, Quintessence Publishing Co.
Inc.

\$68 (US); 176 pages, 202 illustrations (184 in color)

ISBN: 0-86715-290-7

This book discusses the role of dental bleaching treatments in today's dental practice. The first three chapters are directed toward the concepts of bleaching, chemistry of bleaching, and diagnosis and treatment planning. Chapters four to six are step-by-step clinical techniques that are richly illustrated by clinical pho-

tographs, charts and diagrams. The last chapter deals with treatment combinations that include bleaching together with other modalities.

Elegantly designed and produced, the book documents the rich clinical experience of the authors who are very prominent in the field of esthetic dentistry. Nevertheless, the book contains some uncertainties and flaws. The preface (p. vii) states that "few dental treatments have been more successful in the past decade than bleaching teeth," while further on, in Chapter 1, serious concerns are expressed about treatment success and longevity (p. 11). The section on the causes of discoloration could be further supported by medical references in addition to the dental ones. The chapter "Chemistry of Bleaching" would benefit from more depth into the subject, unless it is the authors' intention to keep it simple.

Although the clinical photographs are of excellent quality, some are misleading. For example, Figs. 1-3 and 1-5 (before and after) show different light exposures, so that one might conclude the porcelain crowns were also bleached. Also, Figs. 1-7 and 1-9 (before and after) show different fields, which may not be convincing enough about the results of the treatment. The book is not free of typographical errors (Ref. 1, p. 22; Ref. 5, p. 33), and some legends provide misleading descriptions of the photographs (Fig. 6-9 c, d).

This book could be useful to practitioners who are interested in acquiring an elegant step-by-step technique manual, but readers should be aware of the fast changes in materials and techniques. Dental students would find little value in this book because of the shallowness of the scientific material it contains.

Reviewed by:

Amazis N. Louka, BDS, HDD,
M.Sc.
Associated professor, restorative
dentistry, University of Manitoba.



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NEWS UPDATE

CDA Appoints Director of Practice Management Support Services



Mr. James Gagnon.

James Gagnon, of Repentigny, Quebec, has been selected as director of CDA's newest department effective July 2, 1996. The practice management support services department

will address the issues that impact directly on members' day-to-day practices. As the director of this department, Mr. Gagnon's initial areas of responsibility include third party dental plans, practice management, taxation and CDAnet.

Mr. Gagnon comes to CDA headquarters with a Bachelor of Arts degree from the University of

Montreal, and a wealth of experience gained over many years as a senior consultant and advisor within the insurance industry. For a period of five years in the late 1980s, he served as vice-president of group sales and marketing for Quebec Blue Cross. ■

B.C. Public Benefits From Disciplinary Fines

Residents of interior British Columbia are benefiting from the fines imposed on dentists at court of inquiry proceedings at the College of Dental Surgeons of British Columbia. Through a unique arrangement with local dental societies — who are asked to donate amounts equal to the disciplinary fine — public facilities are able to purchase dental equipment that they otherwise would not have been able to afford.

In one instance, a regional hospital was able to purchase \$5,000 worth of sedation equipment. In another case, \$4,000 worth of dental equipment was provided for a seniors' residence, and in Kamloops,

\$10,000 went toward the purchase of hospital emergency-room dental operatory equipment. In addition to these grants, funding in the amount of \$4,800 went toward remedial emergency dental treatment for eight patients who required care during the review and inquiry process. ■

Pelton & Crane Issues Safety Alert

Pelton & Crane, a division of the Siemens Company in Charlotte, North Carolina, has issued a safety alert to warn customers that its ceiling- or track-mounted Light Fantastic operatory light may fall from the ceiling. The problem may result when the set screws become loose over time, or have not been properly replaced if the light was relocated. The company is asking dentists to verify that all set screws are present and in good condition, and that the special roll pins, provided in all Light Fantastic manufactured since 1987, are also present. If the roll pins are missing, dentists should

CDA and Ovide Mercredi Meet to Discuss NIHB Program

When representatives of CDA met with Assembly of First Nations Grand Chief Ovide Mercredi to discuss changes to Health Canada's Non-Insured Health Benefits (NIHB) program in Ottawa on June 24, the two sides joined forces to achieve a common goal.

CDA president, Dr. James Brookfield, and Dr. Bradley Holmes, a member of CDA's medical services branch sub-committee, expressed concerns with the unilateral changes to the program's dental benefits that took effect on January 1, 1996, describing them as restrictive and regressive.

"The limitations introduced to the plan are not found in any other third party dental plan in Canada," said Dr. Holmes. "They mark a step backward in their restorative, rather than preventive approach."

"I cannot understand why the federal government department responsible for health would move away from prevention," said Dr. Brookfield, "especially when the Liberal Red Book states that preventive care is an important part of Canada's health care delivery system."

"CDA understands Health Canada's desire to manage the program in a cost-effective way, but we question whether these changes will achieve any savings."

For example, the pre-authorizations that were introduced to the plan mean that patients in remote areas,

who normally fly to larger centres for dental treatment, will be required to return home and wait for approval of the prescribed procedures. If the procedures are approved by the plan's administrator, Liberty Health, the patient will then have to return, by air, to have the treatment performed.

Representatives of both CDA and the Assembly of First Nations have met with staff from Health Canada's Medical Services Branch several times to attempt a resolution of the inequities in the plan. ■



CDA president Dr. James Brookfield met with Assembly of First Nations Grand Chief Ovide Mercredi in Ottawa, June 24.

CDA Meets With Health Minister

The amalgam issue and the possible taxation of employer-sponsored health and dental benefit plan premiums were at the top of the agenda when members of CDA's management committee met with Health Minister David Dingwall on May 2.

The meeting, which was held in Mr. Dingwall's office, allowed CDA an opportunity not only to express dentistry's position on amalgam, taxation and tobacco use, but it also opened the door to more open and frequent consultation with the minister.

"I was especially pleased that you are willing to continue discussions related to the Health Canada position paper on dental amalgam," said Mr. Dingwall in a post-meeting letter to CDA. "Stakeholder input has been particularly important to help focus on the scientific issues and risk management options available to us ...



CDA president Dr. James Brookfield presented Health Minister David Dingwall with a CDA sweater at the conclusion of their May 2 meeting.

"I reiterate my invitation to contact me or my office on a regular basis. I enjoyed our meeting, and look forward to seeing you again." ■

contact an authorized Pelton & Crane dealer. ■

Sealant Monomers Exhibit Estrogen-like Properties

A study published in the March 1996 issue of *Environmental Health Perspectives* reports that monomers leached from resins may mimic the female hormone estrogen. Conducted by scientists at the University of Granada in Spain, and Tufts University in Boston, the small, but well-controlled research showed that monomers from sealants — BA-dimethacrylate and its precursor bisphenol A — stimulate the proliferation of human breast cancer cells in laboratory cultures.

Dr. Daniel Meyer, director of the American Dental Association (ADA) division of science, cautions against quick conclusions. "While (the study) was well-designed, we don't know if it reflects clinical situations. But it does merit further investigation... What the study did not address is whether these chemicals would be absorbed by the body or whether they would be metabolically degraded. What's key here, and what we don't know, is whether the estrogen-like effects of monomers have any clinical consequences."

The ADA council on scientific affairs is considering whether to co-ordinate a study on sealants and estrogenicity and, according to Dr. Meyer, they "will continue to moni-

tor additional laboratory and clinical testing and then determine whether new recommendations are appropriate." ■

French-Language Taking Care of Business Manuals Available

Volume's one and two of CDA's *Taking Care of Business* practice management manuals are now available to dentists in the official language of their choice.

"The *Taking Care of Business* program has been very successful," said Linda Teteruck, CDA's director of communications, "and we are very pleased to have the manuals and other program material available in both French and English."

The manuals — entitled *Practice And Value Management*, and *Associate And Transition Planning* — are available to both members and non-members at a slight price differential. Dentists who are interested in purchasing *Taking Care of Business* manuals should contact the CDA at (613) 523-1770 (ext. 297), or 1 (800) 267-6354. ■

Quebec Gains Second Seat on CDA Board of Governors

An increase in CDA membership in the province of Quebec has resulted in a second Quebec representative on the CDA board of gov-

ernors. Effective July 5, 1996, the position will be filled by Dr. Gerald (Jerry) Dushkin, of Montreal.

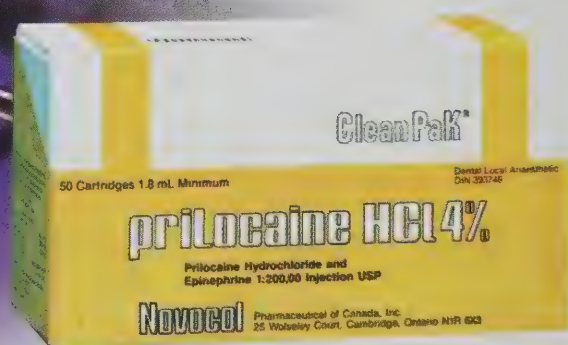
Dr. Dushkin graduated from the McGill University faculty of dentistry in 1979, and completed a residency in pediatric dentistry at Montreal's Children's Hospital in 1980. He has maintained a private general practice limited to the treatment of children in Montreal East since 1980. He has been involved with organized dentistry since 1979, and brings a wealth of experience to the CDA board.

"Having two governors from the province of Quebec on the CDA board is a very positive development," said CDA president Dr. James Brookfield. The increased Quebec membership is indicative of the new cooperative relationship between the national association and the Quebec Dental Surgeons Association (QDSA), who will share a booth at the CDA Convention in Montreal from August 17 to 20. ■

OBITUARIES

Duncan, Dr. Ralph McLaren: Dr. Duncan was born in Calgary, Alta., on July 26, 1923. He graduated from the faculty of dentistry, University of Alberta, in 1944, and was a life member of both the Alberta and Canadian Dental Associations. Dr. Duncan died June 24, 1996. Donations may be made to the Dentistry Canada Fund, Education Component, 1815 Alta Vista Drive,

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McCullough, Dr. John K.: Dr. McCullough of Niagara Falls, Ont. graduated from the University of Toronto's faculty of dentistry in 1951. He died March 29.

Pearce, Dr. George Arthur: During World War II, Dr. Pearce served as a navigator in the Royal Canadian Air Force. After the war, he attended the University of Alberta, and received his DDS in 1950. He practised in Trochu, Alberta, until he retired in 1984. He died June 19, at the age of 76.

LIBRARY PACKAGE

The Library Package — or Search of the Month — for August is **PATIENT'S HEALTH HISTORY FORMS**. This package is available to CDA members for \$5, plus applicable taxes, and to non-members for \$10, plus applicable taxes.

New Acquisitions:

Fejerskov, O. [editor] *Fluoride in dentistry*. 2nd ed. Munksgaard, 1996.

Oral & Maxillofacial Surgery Clinics of North America. "Surgical care of the elderly." W.B. Saunders. May, 1996.

All of the Library's texts are available for loan to CDA members — please contact us for fee information. To order the Search of the Month, or to borrow a book or video, please contact the CDA library at:

1-800-267-6354 (ext. 223),
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COLLEGE OF DENTAL SURGEONS OF BC REGISTRAR POSITION AVAILABLE

The College of Dental Surgeons of BC wishes to announce a search for the position of Registrar. This position will be full-time, to replace Dr. Roy Thordarson who will re-assume the position of Executive Director of the College.

The duties of the Registrar will be the administration of:

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The clinical performance of posterior composite resin materials

The concern regarding the mercury content of amalgam and the increased interest in esthetic restorations has led to a great increase in the use of posterior composite resin. The most significant drawback to the use of composite resin in posterior restorations has been the clinical performance and durability of these materials. This article details the advances in technology and the properties of esthetic materials currently available for use in posterior restorations.

One of the greatest weaknesses of posterior composite resin materials is their low resistance to wear. This has been greatly improved with the current generation of materials. The changes that have been implemented over the years include a decrease in particle size, light cured composites and microfill resins which can be polished. The most recent development is multi-use or so called universal resin materials that can be used in anterior and posterior restorations. These materials are highly effective for polishing and have good strength and resistance to wear.

The following is a compilation of some of the composite resin materials that are currently available for use in posterior restorations. The benefits and clinical uses of each material are listed.

1. *All Purpose Hybrid A.P.H. (LD Caulk)*: This material has superior color matching properties and has an annual wear rate of 19 microns. This material is suitable for both posterior and anterior restorations.
2. *Total Performance Hybrid T.P.H. (LD Caulk)*: From the same manufacturer as A.P.H., this material has almost two times the resistance to wear (10 microns per year) and can be polished. This material is a good choice for the restoration of incisal edges with critical esthetics.
3. *Brilliant D.I. (Coltene/Whaledent)*: This material can be used for direct restorations in the anterior and posterior and is suitable for inlay/onlay restorations. Heat treatment of this material will improve its resistance to wear by up to 40 per cent. The annual wear rate of the untreated material is 15 microns.
4. *Charisma (Kulzer)*: This composite resin has a high resistance to wear (annual wear rate: eight to nine microns per year). The color matching of this material is excellent and there is little tendency for marginal ditching. Heat treatment

will increase the resistance to wear by up to 45 per cent.

5. *Clearfil Photoposterior (Kuraray)*: The use of small quartz particles as a filler imparts a high resistance to wear with an annual wear rate of seven microns per year. The quartz crystals can bond chemically with the resin matrix for increased strength, but this material cannot be polished to a high degree of smoothness. There is good resistance to wear and fracture but it is possible that the quartz will wear the cusps of teeth opposing these restorations.
6. *EPIC-TMPT (Parkell)*: The filler particles of this composite resin can also be bonded to the resin matrix. This material has excellent wear resistance and can be polished with little marginal ditching.
7. *Heliomolar RO (Ivoclar)*: RO stands for radiopaque and this resin has an annual wear rate of seven to eight microns per year. It is a good material for both polishing and color matching. There is some fluoride release from Heliomolar RO which may contribute to resistance to secondary decay.
8. *Herculite XRV (Kerr)*: The surface of this composite resin is highly effective for polishing, but there is a tendency toward marginal ditching. The annual wear rate is 15 microns per year. Strong occlusal forces can cause a bulk fracture in this material. The incisal component of Herculite appears to be almost twice as wear resistant that the standard material and increased resistance to wear could be imparted by veneering the incisal material over a restoration.
9. *Marathon (DenMat)*: The clinical performance of this material is good with a wear rate of 15 to 16 microns per year which can be improved to eight microns per year by the addition of Infinite Cure. Infinite Cure will help to polymerize even large restorations where light curing alone will not.
10. *P-50 (3M)*: This material is much less translucent than many other posterior composite resins but has a wear rate of only six to seven microns per year. P-50 is also resistant to bulk fracture and marginal ditching. This is a good material to use if there is a need for strength and durability as opposed to critical esthetics.
11. *PERTAC (ESPE/Premier)*: This material is quartz filled and appears

to pose a risk for wear of the opposing occlusion. It is not possible to polish this material to a high shine, but color matching and stability are excellent. PERTAC is highly resistant to wear and resists bulk fracture and marginal ditching.

12. *Post Com II (Pentron)*: This composite resin is resistant to fracture, but the opacity is greater than a lot of other resins. The annual wear rate is 10 to 12 microns per year and the filler size of one micron is larger than many other materials which precludes a great deal of polishing. This is an excellent material for posterior areas of high occlusal forces where esthetics are not critical.
13. *Tetric (Ivoclar)*: This resin contains four different fillers. The annual wear rate is seven to eight microns per year and there is a great resistance to bulk fracture and marginal ditching. This material is highly effective for polishing, with good color matching abilities.
14. *Z-100 (3M)*: This composite resin is based on P-50 but has a higher translucency. It is highly effective for polishing due to a smaller particle size and is highly resistant to wear. The color matching ability of this material is so good that it is difficult to determine what is resin and what is tooth during polishing. Marginal ditching can be a problem with Z-100 if the margin is contacted by an opposing cusp.

The placement of posterior resins is quite sensitive to technique, and proper isolation and adequate time are essential to success. The placement of composite resin requires etching, bonding, incremental placement of the material and light curing. These factors along with shaping and adjusting the occlusion require significantly more time and effort than amalgam restorations. The risk of recurrent decay in the marginal areas of posterior composite resins indicates a need to limit their use to patients with adequate oral hygiene. It is important to properly evaluate the occlusion, the size of the lesion to be restored and the patient's ability to maintain the restoration before proceeding with posterior composite resin restorations.

Leinfelder, K.F. JADA 126:663-676, 1995
Reprinted with the permission of THE DENTALETTER, May 1996, p. 33-34.



INTERNATIONAL



September 4-8

18th Biennial Conference of the New Zealand Dental Association — Tomorrow's Dentistry Today in Rotorua, New Zealand. Contact the NZDA Conference Secretary, Dr. Roger Ayers, 19 Pukaki St., Rotorua, New Zealand. Tel.: +64 7 348 5385, or fax: +64 7 348 6788.

September 20-22

Australian Academy of Dentomaxillofacial Radiologists — 1996 Scientific Meeting in Gold Coast, Australia. Contact Dr. Ross Macdonald, 195 North Terrace, Adelaide, South Australia, 5000. Tel.: 61-8-(08) 223-2559, or fax: 61-8-(08) 223-2517. E-mail Internet: 100236.1444@CompuServe.COM

September 28 - October 1

FDI 1996 — 84th World Dental Congress in Orlando, Florida. Contact Laura Stephenson. Tel.: (613) 523-1770 ext. 246 or 1-800-267-6354.

October 4-5

4th International Congress on Esthetic Dentistry (CIDE 96) in Paris, France. Organized by the French Society of Esthetic Dentistry with simultaneous translation French/English. Contact the French Society of Esthetic Dentistry, 33 rue de Prony, 75017 Paris, France. Tel.: 33 1 42 27 31 78, or fax: 33 1 47 64 14 25.

October 5-8

International Conference on Stress and Health — ISMS 6 in Sydney, Australia. Contact F.J. McGuigan, Institute for Stress Management, 10455 Pomerado Rd., San Diego, Calif. 92131. Tel.: (619) 635-4698, or fax: (619) 635-4669. Internet: NOSTRESS@sanac.USIU.edu.

November 27-30

5th Pakistan International & 18th National Dental Conference in Karachi, Pakistan. Contact the College of Dental Surgery, Liaquat Medical College, Jamshoro, Hyderabad, Sindh, Pakistan.

December 6-7

Symposium — 20 Years in Periodontal Local Drug Delivery: Current Applications and Future Trends in London, U.K. Contact the Conference Manager (Dental), The Medicine Group (Education), 62 Stert St., Abingdon, Oxfordshire, OX14 3UQ, U.K. Tel.: + 44 1235 555770, or fax: +44 1235 554691.

CANADA



August 17-20

Canadian Dental Association 1996 Convention in Montreal. Contact Laura Stephenson. Tel.: (613) 523-1770, ext. 246, 1-800-267-6354, or fax: (613) 523-3062.

September 6

Fee-For-Service Dentistry versus Managed Care. Speaker: Dr. James Pride. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

September 6-8

Royal College of Dentists of Canada Convocation, Annual Dinner and Annual Meeting in Montreal, Que. Contact Kay Montgomery. Tel.: (416) 929-2722, or fax: (416) 929-5924.

September 6-8

Canadian Academy of Pediatric Dentistry Annual Meeting in Halifax, N.S. Contact Dr. Ross Anderson, IWK-GRACE Health Centre, P.O. Box 3070, Halifax, N.S. B3J 3G9. Tel.: (902) 428-8148, or (902) 428-8678.

September 7

Successful Cosmetic Dentistry: Methods, Materials, and Marketing. Speaker: Dr. Jeff Golub-Evans. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

September 7

Putting Patients At Ease in Sydney, N.S. Presenter: Dr. A.E. MacLeod. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

September 21

Oral Medicine For The Health Provider: Diagnosis and Treatment of Oral Diseases Secondary to Immunosuppression and Cancer Therapy. Presenter: Dr. Francina I. Lozada-Nur. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

September 26-28

4th Annual Scientific Meeting of the Canadian Academy of Restorative Dentistry and Prosthodontics — "Perfecting the Art and Science" in Vancouver, B.C. Contact Dr. J. Ivan Johnson, 200-1544 Marine Dr., West Vancouver, B.C. V7H 1H8. Tel.: (604) 922-7040.

October 2-6

32nd Annual Meeting of the Canadian Academy of Endodontics in Kelowna, B.C. Contact Dr. W.J. Froese. Tel.: (604) 763-0855, or fax: (604) 763-1124.

October 3-5

Canadian Association of Orthodontists Annual Scientific Session, in Toronto, Ont. Contact Diane Gaunt. Tel. (416) 491-3186, or fax: (416) 491-1670.

October 4

Why Are Men So Strange and Women So Weird/Staying Energized in a Draining World. Speaker: Dr. Bruce Christopher. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

October 4-5

Nitrous Oxide Conscious Sedation. Presenter: Dr. David Donaldson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 5

Computers in Dentistry. Presenter: Mr. William Hiltz. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 11

Seminar on Geriatric Dentistry in Toronto, Ont. Contact Leanne Babineau, Geriatric Division, Department of Dentistry, Sunnybrook Health Science Centre, 2075 Bayview Ave., K-G 130, Toronto, Ont. M4N 3M5. Tel.: (416) 480-4863, or fax: (416) 480-5757.

October 11-12

International Conference on Computer Applications in Dental Practice and Education at the University of Montreal. Contact Dr. Arto Demirjian, Faculty of Dentistry, University of Montreal. Tel.: (514) 343-6072, or fax: (514) 343-2233.

October 19

Contemporary Restorative Dental Materials in Wolfville, N.S. Presenter: Dr. Terry Donovan. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.:

(902) 494-1674, or fax: (902) 494-2527.

October 25-26

Thompson Okanagan Dental Society Annual Meeting and Convention in Kelowna, B.C. Contact: Lane Shupe. Tel./fax: (604) 764-2247.

October 30

The Changing World of Preventative, Restorative, and Esthetic Dentistry. Speaker: Dr. Richard Simonsen. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

November 1-2

Southern Ontario Surgical Orthodontic Study Group will meet in Windsor, Ont. Contact Dr. Jeff Berger. Tel: (519) 258-2632, or fax: (519) 258-2637.

November 2

Treatment Planning Crowns and Bridges For Our Aging Population. Presenter: Dr. Joseph A. Clayton. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 15

Current Issues in Pediatric Dentistry. Speaker: Dr. Michael Sigal. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

November 15-16

Dental Update '96. Coordinator: Dr. Andrew Thompson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 30

Medical Emergencies in the Dental Office. Presenters: Dr. Reginald Godday and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

January 10, 1997

Facial Pain Management Update, 1997. Speaker: Dr. Parker Mahan. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

January 11

Temporomandibular Joint Diseases, Facial Pain. Presenter Dr. A.K. El Geneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

February 28

Excellence With the Most Recent Advances in Endodontics Today. Speaker: Dr. Clifford Ruddle. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 14

Occlusion and Esthetics — an Oxymoron. Speaker: Dr. Bruce Small. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

U.S.A.



September 5-6

Second Annual Conference on Geriatric Oral Health — Dentistry and Drugs in the Elderly — in Ann Arbor, Mich. Contact the Office of Continuing Dental Education, University of Michigan. Tel.: (313) 763-5070.

September 25-27

59th Annual Meeting of the American Association of Public Health Dentistry in Orlando, Fla. Contact the AAPHD National Office, 10619 Jousting Lane, Richmond, Va. 23235-8344. Tel.: (804) 272-8344, or fax: (804) 272-0802.

November 4-5

American Board of Oral and Maxillofacial Radiology — 1996 Certifying Examination in San Diego, Calif. Application deadline was May 3, 1996. Contact Dr. R. Curtis Lundeen, Oral Radiology, Oregon Health Sciences University, School of Dentistry, 611 S.W. Campus Dr., Portland, Ore. 97201-3097. Tel.: (503) 494-8930.

June 21-27, 1997

International Association of Dento Maxillo Facial Radiology in Louisville, Ky. Held in association with the **3rd International Congress on Computed Maxillofacial Imaging**. Contact Dr. Neill Serman, Division of Oral Radiology, School of Dental and Oral Surgery, Columbia University, 630W 168 St., New York, N.Y. 10032. Tel.: (212) 305-5674, or fax: (718) 601-6836.

DENTAL MEETINGS



August 16-17

Annual Meeting of the CDA Board of Governors, in Montreal. Contact Suzanne Burton. Tel. (613) 523-1770, ext. 201, or 1-800-267-6354.

August 17-20

CDA 1996 Convention in Montreal. Contact Laura Stephenson. Tel.: (613) 523-1770, ext. 246, or 1-800-267-6354, or fax (613) 523-3062.

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CLINICAL



Lip Cancer: A Review

J.D. Awde, B.Sc., DDS, Dip. Perio, MD, M.Sc.

S.L. Kogon, DDS, M.Sc.

R.J. Morin, DDS

ABSTRACT

Dental examinations should routinely include examination of the lips by visual inspection and palpation. The primary risk factor for lip cancer is actinic damage. Squamous cell carcinoma of the lip accounts for about nine per cent of all oral cancers, but there has been a downward trend in the number of cases reported from 1973 to 1984. This trend may be due to the increased use of sunscreens. The clinical presentation and management of lip cancer are discussed.

SOMMAIRE

Les examens dentaires devraient comprendre régulièrement l'examen des lèvres par inspection visuelle et palpation. Les principaux risques des cancers labiaux sont les dommages actiniques. L'épithélioma malpighien spino-cellulaire compte pour environ neuf pour cent de tous les cancers buccaux, mais dans tous les cas signalés de 1973 à 1984, on a observé une tendance à la baisse. Cette tendance est peut-être due à l'usage de filtres solaires. Dans cet article, on explique la présentation et la gestion cliniques des cancers labiaux.

Histologically, the vermillion is a modified mucosal surface. Carcinoma of the lip accounts for nine per cent of all oral cancer, and about 0.2 per cent of all malignant neoplasms, excluding non-melanoma skin cancer.² By far, the most common form of cancer on any part of the lip is the squamous cell carcinoma, with rare contributions from salivary gland carcinomas, and a variety of other unusual malignancies.³ Lip cancer is predominantly a disease of the lower lip, accounting for 88 to 98 per cent of cases.⁴⁻⁷ Lesions of the commissures are uncommon, occurring in only two per cent of cases or less.^{8,6} However, the commissure is involved by extension of the carcinoma about five per cent of the time.

The overall incidence of lip cancer in Canada is 2.7 cases per 100,000,⁹ with incidence being highest in white males. This is in contrast to the incidence of lip carcinoma in black males, and females of both races, which is 0.3 cases per 100,000.⁹ The incidence is higher in older age groups. White males, 80 to 84 years of age, have an incidence of 31.3 cases per 100,000, whereas females of the same age group show an incidence of 3.6 cases per 100,000.⁹ There is considerable regional variation. The incidence of lip cancer in all ages of males in Newfoundland is about three times the national average, at 14.3 cases per 100,000.¹

Although there were more than 700 cases of lip cancer reported in Canada in 1991,⁹ there was a downward trend in the number of lip cancer cases reported from 1973 to 1984 which may be attributed to the use of sunscreens while outdoors.¹⁹

Etiology

Although tobacco use of all types has been associated with lip cancer, current epidemiological research focuses on actinic exposure in the initiation of lip cancer. The roles of poor oral hygiene, chronic trauma, and exposure to tars and crude oils, have not been substantiated.

The primary risk factor for carcinoma of the lip is actinic damage.³ Nearly all cases of squamous cell carcinoma of the lip develop in areas of pre-existing actinic cheilitis.¹¹ There are acute and chronic forms of actinic cheilitis. Acute actinic cheilitis manifests as superficial inflammation, possibly with blistering. Chronic actinic cheilitis results in blurring of the junction between skin and vermillion, development of vertical striations perpendicular to the skin/vermillion border, hyperkeratosis, velvety erythema, and a thickened ridge of the skin below the lip. However, all cases of actinic cheilitis do not proceed to squamous cell carcinoma, and the proportion that does is unknown.

Introduction

Cancer of the lip occurs on the vermillion and the immediately adjacent skin.¹



Fig. 1: Male, age 68. Squamous cell carcinoma of the lip showing shallow ulceration, with an indurated border.

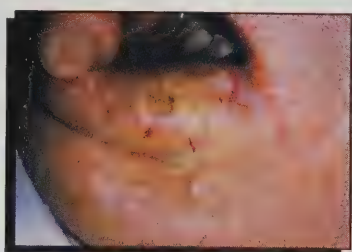


Fig. 2: Squamous cell carcinoma of the lip, showing extensive ulceration of the lip, blurring of the skin/vermillion border and induration.

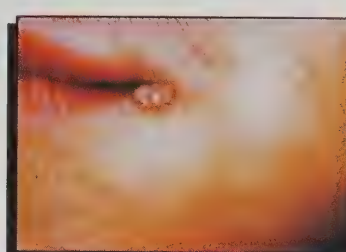


Fig. 3: Squamous cell carcinoma of the lip presenting as an exophytic lesion at the commissure.

Clinical Appearance and Course

Advanced squamous cell carcinoma of the lip most often appears as a chronic non-healing ulcer (Figs. 1 and 2), or as a warty exophytic growth (Fig. 3). However, the early stages of carcinoma are difficult to distinguish from actinic cheilitis. In fact, dysplasia and early squamous cell carcinoma may co-exist in areas of actinic cheilitis.¹¹

Palpation of the lip may reveal an area of induration if there is a loss of the sharply defined vermillion border. Verrucous changes, erythema, non-healing lesions, and hyperkeratosis are all indicative of malignancy and must be examined carefully. A definitive diagnosis can only be achieved by biopsy. Cytology and toluidine blue staining do not play a role in the diagnosis of lip cancer.

The clinical behavior of carcinoma of the lip is variable. Most lesions remain localized and grow slowly, spreading laterally and peripherally rather than invading deeper structures.¹² However, other more aggressive forms spread by direct invasion of adjacent skin and bone, perineurial extension or to regional lymph nodes. For the lip, the submandibular lymph nodes are the most frequently involved, followed by the submental, the jugular chain, and the intraparotid lymph nodes.³

At the time of primary tumor diagnosis, the overall proportion of patients with carcinoma of the lip who have cervical lymph node metastases ranges from two per cent to 16 per cent, with an average of eight per cent.³ However, the incidence of lymph node in-

volvement is higher for those lesions involving the commissure (15 to 19 per cent).^{8,13,14} Between five per cent and 13 per cent of patients presenting with lip cancer and no cervical adenopathy develop cervical lymph node metastases subsequent to treatment.^{4,15-18}

To assist in the development of prognosis and the comparison of treatment outcomes, each case of lip carcinoma should be staged into clinical groups, using the TNM system (tumor, regional lymph nodes, distant metastases) (Table I).

Lip carcinomas are usually well-differentiated tumors, although exceptions occur. The pathologist will include the level of differentiation in the report. Other histopathologic features which correlate with the clinical behav-

ior of lip cancer include tumor thickness greater than 6 mm, perineurial invasion, and deviant growth patterns.²⁰

Treatment and Prognosis

Lip cancer usually presents at an early and therefore curable stage. There are a variety of surgical and radiotherapeutic methods which have proven successful in the treatment of lip carcinoma. Five-year survival rates for lesions less than 20 mm exceed 90 per cent with either treatment modality.²⁻⁴ Larger tumors (greater than 20 mm) including those which invade the mandible, have cure rates of less than 50 per cent.⁴ Lymph node metastases have an adverse effect on survival, with five-year survival rates varying between 29 per cent and 68 per cent, having

Table I

TNM Stages of Carcinoma of the Lip¹⁹

T1S	Pre-invasive carcinoma
T1	Tumor 20 mm or less in greatest dimension
T2	Tumor more than 20 mm but not more than 40 mm in greatest dimension
T3	Tumor more than 40 mm in greatest dimension
T4	Tumor greater than 40 mm with deep, invasion and/or invasion of adjacent structures (eg. through cortical bone, tongue, skin of neck)
N0	No clinically positive lymph nodes
N1	Single positive homolateral nodes less than 30 mm
N2	Single positive homolateral nodes greater than 30 mm, but less than 60 mm or multiple positive nodes less than 60 mm or bilateral nodes or contralateral nodes less than 60 mm
N3	Metastases in nodes greater than 60 mm
M0	No evident metastasis
M1	Distant metastasis present

an average of about 50 per cent.^{4,5,22} Although local recurrence of disease is infrequent, recurrence rates increase in relation to the size of the primary tumor.³

Summary

The lip is a junctional structure with lymphatic drainage from both upper and lower lips mainly to submandibular lymph nodes. Squamous cell carcinoma accounts for the vast majority of lip cancers, affecting the lower lip in 90 per cent of cases. The major etiologic factor in the development of lip cancer is exposure to solar radiation. The lip must be examined both visually and by palpation, especially in elderly patients and those chronically exposed to sunlight. Histological grade, perineurial invasion, tumor thickness, and deviant growth patterns correlate with prognosis. Treatment can be either surgical and/or radiotherapeutic. Cure rates for tumors smaller than 20 mm are 90 per cent, but larger lesions, and lesions associated with lymph node metastases, have cure rates of about 50 per cent. The trend to reduction in lip cancer from 1973 through 1984¹⁹ may be due to public education and the use of sunscreen to prevent exposure to actinic radiation. Dentists have a role not only in clinical examination, but also in recommending the use of sunscreen lipsticks for patients who are at risk of developing lip cancer. ■

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CLINICAL



Removable Partial Denture Design In Alberta Dental Practices

John F. Wolfaardt, BDS, M.Dent., PhD

Han-Kuang Tan, BDS, MSD

Robin M. Basker, DDS, MGDS, LDS

ABSTRACT

Studies published in the dental literature have found, all too frequently, that dentists do not pay adequate attention to the design of cast removable partial denture frameworks. This study investigated removable partial denture design in Alberta dental practices. The authors considered various issues related to surveying, partial denture design, and provider education, as well as the possible collaboration of clinical dentistry with denturism in removable partial denture treatment.

Although the study found that a significant proportion of Alberta's dentists get involved in designing the cast framework, relatively few undertake surveying. Instead, surveying tends to be deferred to dental technicians. As was the case in other studies, no clear reason for this trend emerged, and it appeared to be unrelated to remuneration or time utilization issues. Responding dentists perceived that their undergraduate education was adequate for providing removable partial denture care. The study also identified a need for small, hands-on continuing education courses.

About half of the respondents indicated that it is appropriate for dentists to collaborate with denturists on complete denture care. However, very few respondents considered it appropriate to refer to, or collaborate with, denturists in removable partial denture care.

SOMMAIRE

Dans la littérature dentaire, les études publiées démontrent que, trop souvent, les dentistes n'accordent pas l'attention voulue à la conception des armatures coulées des prothèses partielles amovibles. Cette étude-ci porte sur celles qui sont fabriquées en Alberta. Les auteurs ont pris en compte divers points liés à la mesure et à la conception des prothèses partielles, à la formation des fournisseurs ainsi qu'à la collaboration possible de la dentisterie clinique avec la denturologie dans le traitement des prothèses partielles amovibles.

Bien que l'étude révèle qu'un bon nombre de dentistes de l'Alberta participent à la conception des armatures coulées, un nombre relativement faible en prennent les mesures, confiant plutôt ce travail aux techniciens dentaires. Comme dans les autres études, aucune raison précise n'explique cette tendance et il ne semble pas qu'elle soit liée à des facteurs de rémunération ou de temps. Selon les dentistes interrogés, leur formation du 1^{er} cycle a été convenable pour la prestation de soins en prothèse partielle amovible. Par ailleurs, l'étude a révélé que de petits cours de perfectionnement pratiques s'imposeraient.

Environ la moitié des répondants ont indiqué qu'il convient que dentistes et denturologistes collaborent ensemble pour donner des soins de prothèse complets.

Cependant, très peu pensent qu'il convient d'adresser les patients à des denturologistes ou de collaborer avec eux pour donner des soins de prothèse partielle amovible.

Introduction

The changing population demographics in developed countries are having a profound effect on restorative dentistry. In these nations, the population is getting larger, older and more culturally diverse. This trend has been accompanied by a changing prevalence of edentulism. Adults in the 55- to 79-years-old age group have experienced a dramatic increase in tooth retention. The most remarkable change is in the 65- to 74-years-old age group, however, where functional tooth retention increased from 7.4 in 1962 to reach 17.9 in 1986.¹

In the future, Canada's aging population will require partial dentition restorations of ever increasing complexity which will be associated with greater diagnostic, clinical, technical and maintenance challenges. The complexity of these challenges will be increased by the compromised health status of an aged population.

To provide removable partial denture (RPD) care, the clinician must have an in-depth knowledge of the biological and biomechanical factors that influence the stomatog-

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nathic system. Biological factors must be considered during preparation of the soft and hard tissues of the stomatognathic system, in order to improve and maintain their health. Similarly, biomechanical factors affect the design of the RPD restoration.

From a historical perspective, more interest has been focused on biomechanical factors. In fact, the tools required to evaluate biological factors have only become available relatively recently. Bergman² pointed out that only three of the 20 research articles published on periodontal reactions related to RPDs from 1951 to 1985 appeared in the first 20 years. It is now widely acknowledged in the literature that biological factors are of prime concern, however.²⁻⁶ The RPD may increase or alter the oral bacterial flora of dental plaque, increase the incidence of caries, damage the periodontium and increase the stress on the natural teeth.⁷ Biological factors are managed by appropriate decision making. This requires the thorough integration of a wide range of clinical knowledge domains that impact on diagnosis and treatment planning, as well as active treatment and maintenance. One facet of this inferential pathway is the management of biomechanical factors.

Although much attention has been paid to the mechanical aspects of RPD design in the past, recent interest has been focused more on the impact of design on the biological factors.^{5,7} The principles used in RPD design should be based on science, not whim,⁸ and many studies have been conducted to determine how dentists participate in the provision of care when it involves a RPD.⁹⁻¹³ Results of these studies indicate that general practising dentists do not adequately participate in prescribing a design for RPDs, while prosthodontists pay considerable attention to this aspect of care.⁸

The present study was undertaken to determine how the dental profession in Alberta provides prescribed RPD designs in the treatment of partial edentulism.

Materials and Methods

A questionnaire formulated by Basker et al,¹⁴ and subsequently

Table I
Year of Graduation (per cent)

	Dentists licensed in Alberta	Respondents
Pre 1949	0.6	0.5
1950-1959	4.2	4.6
1960-1969	14.8	16.3
1970-1979	28.3	31.3
1980-1989	33.7	36.4
1990-onward	18.4	10.3
Unusable data	—	0.6
	100.0	100.0

Table II
Type of Practice

	Frequency	Per Cent
General practice	420	95.7
Prosthodontics	11	2.5
Other speciality	6	1.4
Unusable data	2	0.4
	439	100.0

implemented in a U.K. study,¹⁵ was modified for use in the present work. The questionnaire was mailed to members of the Alberta Dental Association. Respondents answered the questionnaires anonymously and returned them to the principal author.

The questionnaire was divided into several sections that requested specific information:

1. General Information
 - type of practice
 - year of graduation
 - number of patients treated with RPDs per annum
 - fee level applied
2. RPD Surveying
3. RPD Designing
4. RPD Education
5. Relationship with Denturists

The data were analyzed to determine the frequency of response distribution for each of the questions asked.

Results

The Alberta Dental Association (ADA) mailed 1,393 questionnaires to its members. A total of 439 (31.5 per cent) responded to

the survey, including 11 prosthodontists (**Tables I to XI**). The responses of the prosthodontists are shown in parentheses. In **Tables III to XI**, the results are presented in terms of valid percentage, and the reader should consider the levels of response within the two respondent groups for each question.

1. General Information

The respondents were placed into three groups by year of graduation and the number of RPDs they constructed per annum. The type of practice was also identified (**Tables I and II**).

Table I shows that the distribution of the respondent groups was very similar to that of licensed dentists in Alberta. The most noticeable difference is in the 1990 and onward group, where a lower percentage of respondents is found. In **Table II**, it is evident that of the 439 respondents, 95.7 per cent were in general practice and 2.5 per cent were prosthodontists. On average, respondents indicated that they constructed 28 RPDs per annum, and 90 per cent of respondents adhered to the ADA suggested fee for this procedure.

Table III
Surveying Procedure In Removable Partial Denture Construction* (valid per cent)

Q 71 Do you own a surveyor?	Yes 76 (100)	No 24 (0)	—	—	Responses 439 (11)	No responses 0 (0)
Q 72 Do you survey the cast before designing the RPD?	Always 14 (82)	Frequently 17 (9)	Infrequently 36 (9)	Never 33 (0)	429 (11)	10 (0)
Q 73 Surveying is important in RPD construction?	Strongly Agree 36 (9)	Agree 52 (2)	Disagree 11 (0)	Strongly Disagree 1 (0)	428 (11)	11 (0)
Q 74 Technician surveys as they are more familiar with procedure?	9 (0)	59 (9)	19 (91)	13 (0)	426 (11)	13 (0)
Q 75 Undergraduate training on use of surveyor is not clear?	1 (0)	10 (0)	52 (18)	37 (82)	430 (11)	9 (0)

*Prosthodontic responses in parentheses.

2. Removable Partial Denture Surveying

Data on RPD surveying are shown in **Table III**. Three-quarters of the respondents owned a surveyor, but only 14 per cent always surveyed the cast. This is of interest, as 88 per cent of respondents felt that surveying the cast was important in RPD construction. Almost 70 per cent "strongly agreed" or "agreed" with the statement that technicians undertook the surveying as they were more familiar with the procedure. Lack of understanding of the survey procedure did not appear to be a concern, however, since only 11 per cent of respondents indicated that their undergraduate training on the use of a surveyor was not clear. All prosthodontists, 100 per cent, reported owning a surveyor, and 91 per cent frequently or always surveyed the cast before designing a RPD. It is interesting to note that 91 per cent of the prosthodontists "disagreed" that technicians were more familiar with the surveying procedure.

3. Removable Partial Denture Design

Seventy per cent of respondents constructed the master cast in their practices (**Table IV**). A detailed prescription was always provided by 66 per cent of respondents, and

54 per cent "always" or "frequently" allowed the technician to make decisions regarding the design prescribed. Only six per cent regularly relied on the technician to assume total responsibility for designing the RPD. As shown in **Table IV**, 91 per cent of the prosthodontists always provided a detailed prescription for RPD design, and 100 per cent constructed the master cast in their offices. Sixty-four per cent of the prosthodontists "infrequently" or "never" allowed technician input into RPD designing.

Specific questions were used to determine why some respondents' regularly provided only a guide, and left all decisions to the dental technician (**Table V**). Interestingly, 75 per cent of respondents either "disagreed" or "strongly disagreed" that technicians were more experienced in designing RPDs. The results indicate that neither time nor fee structure concerns were a disincentive for respondents to undertake the design procedure. At the same time, the vast majority of respondents felt that design was important to the eventual success of the RPD, and only two per cent of respondents "agreed" or "strongly agreed" that designing was unimportant. The reason for involving the technician in designing did not appear to emanate from a lack of confi-

dence, as 85 per cent of respondents reported that they either "disagreed" or "strongly disagreed" that confidence was an issue. However, the response of the prosthodontists (**Table V**) was quite different. All of them strongly disagreed with the proposed statements that the technician was more experienced in designing, that there was not enough time for the design procedure, that design was unimportant to RPD success, and that their lack of confidence was an issue. In addition, 57 per cent of "agreed" or "strongly agreed" that the suggested Alberta Dental Association fee for RPDs was a disincentive.

4. Removable Partial Denture Education

Only 15 per cent of respondents felt that their undergraduate education in removable partial dentures was inadequate. This feeling was more pronounced among the prosthodontists, however, as 27 per cent of this group believed that their undergraduate education in removable partial dentures was inadequate (**Table VI**). The decision on whether continuing education courses had improved clinician confidence was split, with 55 per cent of respondents agreeing and 45 per cent disagreeing. The split for prosthodontists was somewhat

Table IV

Clinician Participation In Designing RPDs* (valid per cent)

Q 51 Construct master cast?	Yes 70 (100)	No 30 (0)	—	—	Responses 439 (11)	No Responses 0 (0)
Q 52 Provide detailed prescription?	Always 66 (91)	Frequently 23 (9)	Infrequently 10 (0)	Never 1 (0)	438 (11)	1 (0)
Q 53 Allow technician input?	24 (36)	30 (0)	30 (18)	16 (46)	434 (11)	5 (0)
Q54 Leave all decisions to technician?	1 (0)	5 (0)	21 (9)	73 (91)	436 (11)	3 (0)

* Prosthodontic responses in parentheses.

Table V

Responses Of Clinicians Who Allow Technician Input or Leave All Decisions To The Dental Technician* (valid per cent)

	Strongly Agree	Agree	Disagree	Strongly Disagree	Responses	No Responses
Q 61 Technician more experienced in designing?	3 (0)	22 (0)	50 (0)	25 (100)	297 (8)	142 (3)
Q 62 Not enough time for design procedure?	3 (0)	12 (0)	50 (0)	35 (100)	297 (8)	142 (3)
Q 63 ADA fees is a disincentive?	3 (14)	23 (43)	60 (29)	14 (14)	295 (7)	144 (4)
Q 64 Design of the RPD unimportant to success?	1 (0)	1 (0)	29 (0)	69 (100)	298 (8)	141 (3)
Q 66 Lack confidence as seldom construct RPDs?	1 (0)	14 (0)	49 (0)	36 (100)	296 (8)	143 (3)

* Prosthodontic responses in parentheses.

different, with 82 per cent agreeing and 18 per cent disagreeing. Seventy-nine per cent of respondents felt that small group hands-on courses would be of help (Table VI). Similarly, 91 per cent of prosthodontists agreed that small group courses on RPDs should be held. In Table VII, it is interesting to note that 64 per cent of respondents had attended continuing education in RPDs in the last five years.

5. Relationship with Denturists

Only 153 (36 per cent) of respondents would refer any category of denture patient to dentur-

ists (Table VIII). Of this total, 143 would refer patients for complete dentures, one would refer RPDs, and 10 would refer both.

Of the respondents, only three per cent would prepare teeth for a denturist to construct RPDs (Table IX). Additionally, only two per cent would read radiographs or provide surveyed full coverage restorations on abutment teeth for denturists undertaking treatment involving a RPD. All prosthodontists stated that they would not provide any of these services for a denturist.

The analysis also considered whether date of graduation influ-

enced the willingness of respondents to refer patients to denturists (Table X). Dentists were divided into three groups: graduation before 1978, from 1979 to 1987, and after 1988. The results indicated that dentists who graduated after 1978 were more likely to refer denture patients to denturists. Year of graduation had no real influence on the type of denture referral (Table XI).

Discussion

The questionnaire asked clinicians to provide information that may have reflected negatively on

Table VI

Removable Partial Denture Education* (valid per cent)

	Strongly Agree	Agree	Disagree	Strongly Disagree	Responses	No Responses
Q 81 Undergraduate education in RPD adequate?	19 (9)	66 (64)	13 (9)	2 (18)	434 (11)	5 (0)
Q 83 Continuing education in RPD has improved confidence?	8 (27)	47 (55)	40 (18)	5 (0)	373 (11)	66 (0)
Q 84 More small group participation courses in RPD should be held?	9 (18)	70 (73)	20 (9)	1 (0)	412 (11)	27 (0)

* Prosthodontic responses in parentheses.

their mode of practice. Additionally, for various reasons, the subject matter of the questionnaire may not have been viewed as a high priority by all clinicians.¹⁶ For these reasons, the study provided for an anonymous response. The only demographic data requested was the respondents' year of graduation and type of practice. Interestingly, the distribution of the respondents' year of graduation was very similar to that of all dentists licensed in Alberta. The survey response rate of 31.5 per cent was not unexpected, given the subject matter and the fact that limited resources did not allow for a reply-paid service or follow-up.

Holt et al¹⁵ made use of a postal questionnaire to general dental practitioners, which was followed up by a second mailing and a letter. This study achieved a 40 per cent response rate. A study based on a questionnaire similar to the present study was used in Sweden.⁶ It was managed by the Central Bureau of Statistics, and was followed up by reminders to non-responders. A response rate of 84.2 per cent was achieved. Another mail survey on the removable prosthodontic services provided by dentists in British Columbia yielded a 47 per cent return rate.¹⁶ A review of these mail surveys indicates a return rate of 30 to 50 per cent, depending on the subject and the group surveyed. The experience of the current study confirms that higher return rates require strategies such as

a reply-paid service, multiple mail-outs, and telephone follow-up.

Previous studies have found that very few dentists undertake surveying and designing of cast metal removable partial dentures.^{6,12,19} In the present study, 88 per cent of respondents believed that surveying was important. However, while 76 per cent owned a surveyor, almost 70 per cent "seldom" or "never" surveyed the cast. Linked to this is the finding that 89 per cent of respondents "frequently" or "always" provided a design prescription. It is interesting to note that the Swedish study by von Steyern et al⁶ and the South African study by Dullabh et al¹⁷ noted similar findings — surveying is considered important, but it is not undertaken as a routine clinical procedure. Dullabh et al¹⁷ speculated that their results could be due to the dentist not possessing a surveyor, lacking confidence in the use of a surveyor, or not having time to do surveying. In the present study, the vast majority of respondents own a surveyor but don't use it. In both the Swedish⁶ study cited above and the current study, neither time nor remuneration for the procedure seemed to be the reason behind the failure to carry out surveying. In the British study by Holt et al,¹⁵ 87 per cent of dentists who left all design decisions to the technician identified lack of financial incentive, and 50 per cent cited lack of time as the reasons.

In the present study, 18 per cent of respondents felt that time was a cause of not designing, and 25 per cent felt the fee was a disincentive. Confidence in carrying out the surveying and design procedure did not seem to be of major concern in either the Swedish⁶ or the present study. A higher percentage of respondents in Alberta (66 per cent) and the U.K. (72 per cent) always provided a detailed prescription of the design than in Sweden⁶ (22 to 39 per cent) or South Africa¹⁸ (32 per cent). This result should be viewed with caution, since a valid interpretation would require further study. A follow-up study in Alberta is planned to determine the validity of the responses to surveying and design procedures.

The subgroup of respondents who were prosthodontists frequently responded quite differently from the non-prosthodontists. They considered the use of a surveyor important. For example, while 70 per cent of the entire group of the respondents "seldom" or "never" surveyed the cast, 91 per cent of the prosthodontists "frequently" or "always" did so. And while 66 per cent of the entire group of respondents "always" provided a detailed prescription, 91 per cent of prosthodontists provided one. The prosthodontists did not agree with the entire group that technicians were more experienced in designing RPDs, and they were also more likely to consider that the Alberta Dental Association fee was a disincentive. From the results of the present study, it ap-

pears that prosthodontists are more directly involved in surveying and designing removable partial dentures. These findings seem to fall in line with those of Burns et al.⁸

It was found that an average of 28 cast RPDs were being constructed by the respondents per annum. In the Swedish study,⁶ the majority of respondents constructed up to 10 RPDs per annum, while others constructed between 20 to 50 per annum. These figures would indicate that it is very important for dentists to be well educated in providing RPD care. The change in tooth loss patterns and demographics¹ show that the need for RPD care will escalate, and that the provision of this treatment will become more challenging. These expected changes favor the need for an enhanced educational experience, both in undergraduate and continuing education programs.

In the present study, most respondents felt that their undergraduate education was adequate (85 per cent), whereas more than half of them (55 per cent) felt that continuing education had improved their confidence in providing RPD care. Given the vast array of continuing education opportunities, it was remarkable that 64 per cent of respondents had pursued continuing education in removable partial dentures. Continuing education in removable partial dentures appears to have some importance for dentists. However, it was also noted that 85 per cent of respondents had attended two or less RPD courses in the past five years (Table VII). It is possible that the available continuing education opportunities have not been favorably structured, since 79 per cent felt that small group participation courses should be held.

Based on the present study, it appears that a minority of Alberta dentists may consider it appropriate to work with denturists in complete denture care, but consider it inappropriate to collaborate with denturists who are attempting to provide removable partial denture treatment. This is seen in the data presented in Tables VIII and IX, which shows that a negligible number of respondents deemed it

Table VII

Number Of Continuing Education Courses On RPD Attended In The Last Five Years* (Responses n = 428 (9); No Responses n = 1 (2))

Number of Courses	Frequency	Valid Per Cent
0	156 (3)	36 (33)
1	122 (2)	29 (22)
2	87 (2)	20 (22)
3	36 (1)	8 (11)
4	15 (1)	4 (11)
5	5 (0)	1 (0)
Rest	7 (0)	2 (0)

*Prosthodontic responses in parentheses.

Table VIII

Types Of Denture Patients Referred To Denturists

	Frequency	Valid Per Cent
Complete dentures	143 (2)	93 (18)
Removable partial dentures	1 (0)	1 (0)
Both	10 (0)	6 (0)

*Prosthodontic responses in parentheses.

appropriate to refer or collaborate with denturists in the provision of RPD care. The present study did not ask respondents to explain their responses to denturism. Since the financial issues in complete and removable partial denture care are not significantly different, it may be speculated that dentists perceive denturists to be unable to provide the comprehensive oral care necessary. As pointed out by McEntee,⁵ RPD care requires the full range of dental diagnostic and clinical skills.

Other possible explanations may relate to their concerns about the fragmentation of patient care and accountability for failed treatment. Many of these failures are likely to result from RPD-invoked biological causes that the dentist is responsible for managing. Consequently, accountability for treatment outcomes may be a cause for further concern when responsibility for treatment becomes fragmented. Interestingly, Table X shows that respondents who graduated after 1978 are possibly

more likely to refer a patient to a denturist. The year of graduation appeared to have no impact on the type of denture patient being referred, however, as even the more recent graduates were not willing to refer removable partial denture patients to a denturist. These findings are of interest since without the collaboration of a dentist to undertake diagnostic, irreversible tissue preparation and maintenance procedures, denturists cannot provide appropriate and responsible removable partial denture care.

Conclusion

Restoration of the partially edentulous mouth requires in-depth clinical knowledge as well as inferential and psychomotor domain skills. The demands on these skills is being further elevated by the increasing complexity of partial edentulism and the compromised medical status of Canada's aging population. The present study shows that dentists in Alberta should be more directly in-

Table IX**Relationship With Denturists* (valid per cent)**

	Yes	No	Responses (n)	No Responses (n)
Would you prepare teeth for denturists providing RPD care?	3 (0)	97 (100)	424 (11)	15 (0)
Would you read radiographs for denturists providing RPD care?	2 (0)	98 (100)	422 (11)	17 (0)
Would you do surveyed crowns for denturists providing RPD care?	2 (0)	98 (100)	421 (11)	18 (0)

*Prosthodontic responses in parentheses.

Table X**Numbers Of Dentists Who Would Refer Patients To Denturists x Year Of Graduation**

Willingness to refer to denturist	Count column (per cent)	Year of Graduation		
		pre 1978	1979 - 1987	1988 onward
	yes	53 (24.7)	63 (44.7)	37 (52.1)
	no	162 (75.3)	78 (55.3)	34 (47.9)

Table XI**Type of Denture Referral to Denturists x Year of Graduation**

Type of Denture	Count column (per cent)	Year of Graduation		
		pre 1978	1979 - 1987	1988 onward
	Complete denture	49 (94.2)	55 (88.7)	39 (97.5)
	Removable Partial Denture	1 (2.0)	—	—
	Both	2 (3.8)	7 (11.3)	1 (2.5)

involved in surveying and designing for RPD treatment. As indicated by the present study, there appears to be communication taking place between the dentist and dental technician in the planning of RPD framework designs. There is a perceived need for small group hands-on continuing education courses in removable partial dentures. The results of the study show that a minority of the respondents collaborated with denturists in complete denture care, but did not appear to deem it appropriate to do so in removable partial denture care. ■

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European	✓ 21.0%	16.4%	n/a		n/a		n/a	
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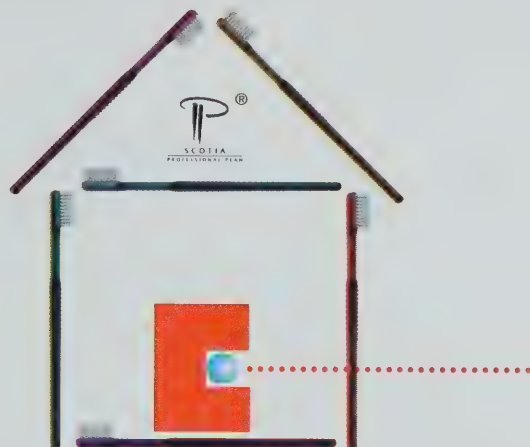
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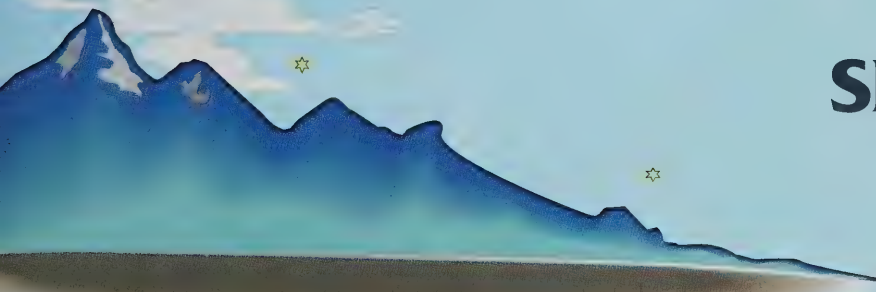
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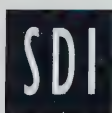
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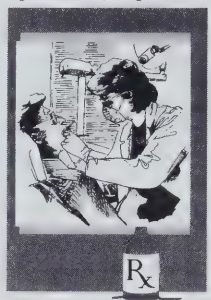
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CLINICAL



Periodontal Diseases Affecting Children and Young Adults

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ABSTRACT

There is a group of periodontal diseases affecting children and young adults that is characterized by onset prior to age 35, often with a rapid rate of periodontal destruction. Although a wide variation in patterns of presentation exist, these diseases can be described under the broad categories of (a) early onset periodontitis (juvenile periodontitis), (b) necrotizing ulcerative gingivitis/periodontitis, (c) periodontitis associated with systemic diseases. A discussion of each of these categories is followed by two case reports which illustrate possible clinical presentations of these diseases.

SOMMAIRE

Il existe un groupe de maladies parodontales qui touchent les enfants et les jeunes adultes et qui se caractérisent par un début avant l'âge de 35 ans, ces maladies étant souvent accompagnées d'une destruction rapide du parodonte. Bien que ces maladies présentent une grande variété de signes cliniques, on peut les grouper dans des catégories générales: (a) début hâtif de la parodontite (parodontite juvénile), (b) gingivite-parodontite ulcéreuse nécrosante, (c) parodontite associée à des maladies systémiques. Après une explication de chacune de ces catégories, on présente deux rapports de cas illustrant les manifestations cliniques possibles de ces maladies.

Introduction

The classification and nomenclature of periodontal diseases has changed over time. The World Workshop in Periodontics in 1966 recognized marginal periodontitis, the response of the periodontal tissues to local irritation, and a rapidly destructive form of periodontal breakdown which could not be explained by local irritation. This latter condition, previously known as periodontosis, was left without a name at that time.¹ A later workshop in clinical periodontics included five forms of periodontal disease — adult periodontitis, early onset periodontitis, periodontitis associated with systemic disease, necrotizing ulcerative gingivitis, and refractory periodontitis.² However, the most recent classification of periodontal diseases affecting children and adolescents comes from the American Academy of Periodontology's January 1996 position paper which suggests three categories: early onset periodontitis, necrotizing ulcerative periodontitis, and periodontitis associated with systemic diseases.³ It is this classification which has been used in this present paper.

Early Onset Periodontitis

Early onset periodontitis (EOP) is a group of periodontal diseases that is generally distinguished from adult periodontitis by age of onset prior to age 35 and a more rapid

rate of attachment loss. The rapid rate of periodontal destruction is due to an alteration in host response and possibly a more pathogenic microflora associated with the disease.^{1,4} In otherwise healthy children, adolescents and young adults, EOP may manifest itself as a localized form, commonly referred to as localized juvenile periodontitis, or as a generalized form, referred to as generalized juvenile periodontitis or rapidly progressive periodontitis.^{5,6}

Localized Early Onset Periodontitis (Localized Juvenile Periodontitis)

Localized juvenile periodontitis (LJP), the most recognizable form of the disease, presents as attachment loss in the molar/incisor regions of the adult dentition, with the onset being circumpubertal.² A definitive diagnosis may be made where three sites exhibit attachment loss of 5 mm or greater.² When first identified in 1942, LJP was thought to be a degenerative condition.⁷ This stemmed from the seemingly minimal involvement of plaque and less acute signs of inflammation. It is now clear that LJP has a microbial etiology.^{5,6}

LJP can be easily missed in its early stages as large deposits of supragingival or subgingival calculus are not present and the limited soft tissue inflammation can be overlooked.² The "classical" radiographic appearance of vertical or concentric loss of alveolar bone

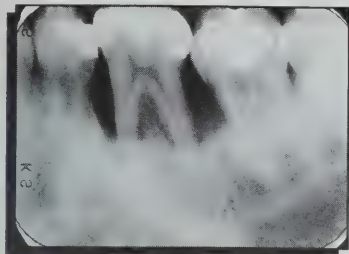


Fig. 1: "Classical" appearance of bone loss in patient with localized juvenile periodontitis.

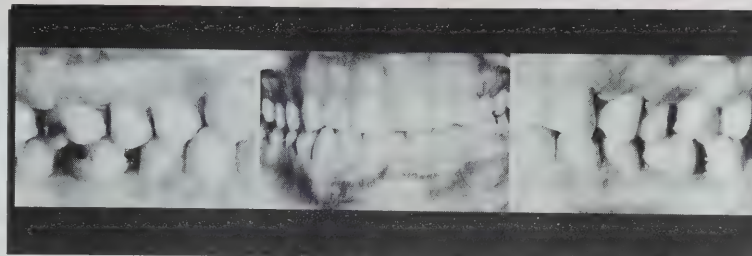


Fig. 2: Initial clinical presentation of Case 1 patient. Erythema and edema of papillary gingival inflammation in posterior sextants, with normal gingival contour in anterior region.

may not be obvious until a significant amount of attachment has been lost (**Fig. 1**).

LJP is most often associated with the bacterium *Actinobacillus actinomycetemcomitans* (Aa).⁸ This microorganism has been found in high concentration and has been related to increased attachment loss in LJP patients.^{8,9} It exhibits a number of characteristics which account for its virulence. For example, Aa produces substances that break down tissue collagen, contribute to bone resorption, and suppress or alter the function of polymorphonuclear leukocytes and lymphocytes.¹⁰ It has also been shown to invade the gingival tissues.¹¹ Although a strong link exists between Aa and LJP, Aa has not been found in every LJP patient and other microbes such as *Bacteroides* sp. have also been implicated.^{10,12}

Poor chemotaxis of polymorphonuclear leukocytes (PMNs) is the alteration in host response thought to be a common occurrence in LJP.^{2,4,5} While not all studies have found a PMN dysfunction,^{13,14} those that have noted PMN defects suggest they are present in 70 to 75 per cent of LJP patients.⁶ The reduction of chemotaxis may be due to the reduction of chemotactic receptors as there is no decrease in receptor affinity. The defects are intrinsic to the PMNs and not reversed by therapy.^{2,5} This altered host response in young individuals, together with the virulence factors of Aa, may explain the early onset and rapid attachment loss.

The incidence of LJP is low. A recent survey of 11,000 14- to 17-year-old school children in the U.S. found the incidence to be 0.53 per cent.¹⁵ Of the ethnic groups sampled in the study,

blacks showed an incidence of 2.5 per cent and Caucasians showed an incidence of 0.59 per cent. These data are corroborated by a genetics study that reported the allele frequency for LJP in the black population to be double that in the Caucasian population.¹⁶

Historically, LJP was thought to be a predominantly female disease.¹⁷ Genetics studies in the 1970s concluded that it was inherited as an X-linked dominant trait.¹⁸ Re-examination of the data, however, found that the observed female:male ratio was due merely to a greater tendency for females to seek treatment.¹⁸ A cross-sectional study found equivalent prevalence in males and females.¹⁵ Some authors have suggested an autosomal recessive mode of inheritance, but they also report that autosomal dominance may be the mode of inheritance in some families.^{20,21}

The treatment of LJP consists of scaling and root planing, often followed by surgical therapy. Treatment by scaling and root planing alone may not necessarily eliminate Aa due to the organism's ability to invade the gingival tissue.¹¹ Because of this, systemic antibiotics have been advocated and some authors also recommend surgical treatment to resect the infected gingival tissue.²² The antibiotic most commonly recommended is tetracycline.^{22,23} The combination of metronidazole and amoxicillin,²⁴ or metronidazole alone,²⁵ have also been suggested for Aa associated periodontitis. This combined approach of mechanical therapy with systemic antibiotics, while not necessarily providing complete elimination of pockets, can stabilize attachment. This means that the extraction of involved teeth, which was once a

common therapy, is no longer necessary except in the most advanced cases of attachment loss.

Generalized Early Onset Periodontitis

The classification of generalized forms of early onset periodontitis has changed. Generalized juvenile periodontitis (GJP) describes a severe form of generalized periodontal destruction with circumpubertal onset, mostly affecting molars and incisors. Rapidly progressive periodontitis (RPP) also describes a severe generalized periodontal destruction but with an age of onset often in the 20s and in which the molars/incisors are not necessarily the most affected. These fine distinctions between the two in age of onset and pattern of disease have been questioned. Various authors consider GJP and RPP to be the same disease entity.^{5,6}

The generalized form of EOP is characterized by generalized and rapid loss of attachment. Inflammation of the gingiva is variable. The age of onset is between puberty and 35. The microbial deposits vary from minimal (as in LJP) to abundant. Affected individuals may also exhibit a defect in PMN or monocyte function.¹³

The incidence of the generalized form of EOP is low. In 1991, Loe and Brown found the incidence of this form of periodontitis to be 0.13 per cent in 14- to 17-year-old school children.¹⁵ While there was no difference in incidence between the sexes, there was a greater incidence found in blacks as compared to Caucasians.

The microbiology of generalized EOP is as complex as that of adult periodontitis.²⁶ Some authors have implicated *Bacteroides gingivalis* as a major pathogen²⁷ but Aa has also been found in these pa-

tients, although its incidence is lower than that seen in LJP.⁹ A recent study in young adults with generalized EOP found that the patients harbored both *Porphyromonas gingivalis* and Aa.²⁷

Few clinical studies discuss the treatment of generalized EOP.²⁷ Those that do, suggest it should be treated similarly to LJP. This involves root debridement in conjunction with surgical therapy and systemic antibiotics. In a recent study of generalized EOP patients, therapy of scaling, root planing and flap debridement was followed by further root instrumentation at three-month intervals. Even then, further periodontal attachment loss was approximately three times that of patients with adult periodontitis.²⁷ This suggests that these patients' oral health may be difficult to maintain to the standards seen in adult periodontitis patients.

Relationship Between Localized and Generalized Forms of EOP

The localized forms and generalized forms of early onset periodontitis may represent different manifestations of the same disease entity, with the extent of the disease related to host response.⁶ This is supported by epidemiology studies in which the youngest individuals found to exhibit rapid periodontal destruction had lesions confined to first molars and incisors but, when left untreated, by age 20 to 30 the destruction was generalized.²⁹ The generalized and localized forms often occur concurrently in families²⁷ and, given their low incidences, it is unlikely that these could be independent diseases.⁶

Both forms of EOP are associated with Aa^{27,8} and Aa has been known to be transmitted between family members.³⁰ Only one serotype of Aa is found in any single family affected by EOP and there is an increased prevalence even in those not affected by periodontitis.³¹ Aa is thought to be acquired through contact from parents during childhood, because it is difficult to transmit in mature individuals, and likely becomes established at the time of tooth eruption.³⁰

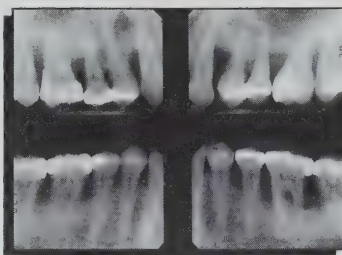


Fig. 3: Periapical radiographs illustrate severely advanced bone loss in posterior sextants.

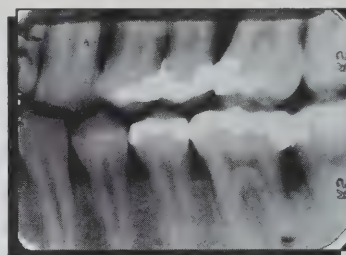


Fig. 4: Patient's radiographs taken at 22 years of age. Note bone loss localized to premolar/molar regions.

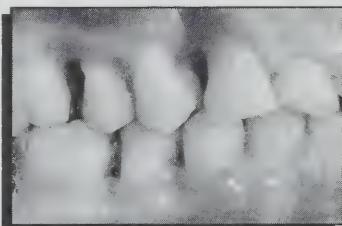


Fig. 5: Post-treatment clinical presentation of Case 1 patient at conclusion of active treatment.

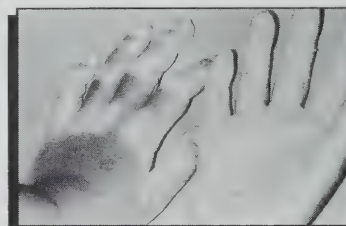


Fig. 6: Palmar hyperkeratosis.

Necrotizing Ulcerative Gingivitis/Periodontitis

This disease occurs infrequently in North American and European populations, but more frequently in children from underdeveloped countries. It is characterized by interproximal ulceration, necrosis and pain. Children are predisposed to this by a variety of factors including malnutrition, stress and viral infections.

Periodontitis Associated With Systemic Disease

Periodontitis may accompany several systemic diseases which occur in childhood and adolescence. Systemic disease such as diabetes mellitus, Down's syndrome, cyclic neutropenia, Papillon-Lefevre syndrome, Chediak-Higashi syndrome, Histiocytosis X, human immunodeficiency virus (HIV) infection, hypophosphatasia, leukemia and leukocyte adherence deficiency may present with periodontal involvement of the permanent or primary dentition.⁵

While most of these diseases are rare, they may occasionally be encountered in general dental practice.

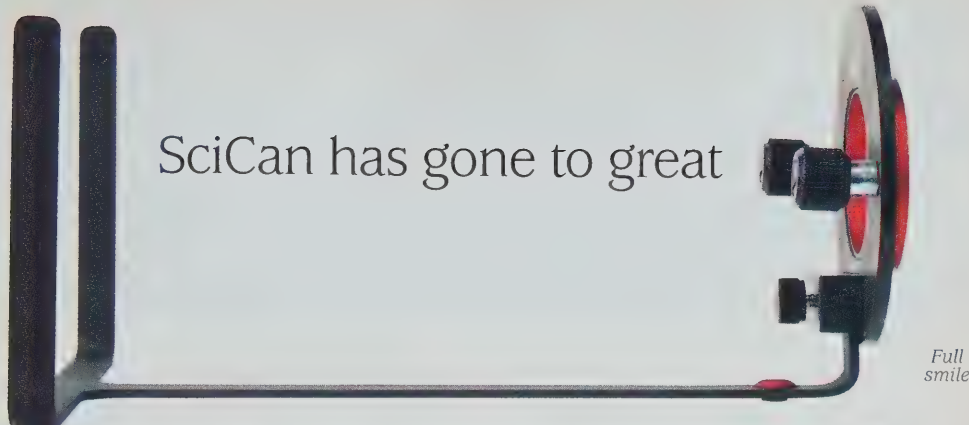
Included under the category of EOP associated with systemic dis-

ease is prepubertal periodontitis (PP). PP was first described as an entity by Page et al in 1983,³² and its generalized form is associated with systemic diseases. It is distinguished from other forms of EOP by affecting the primary dentition, often at the time of tooth eruption. Bone loss can be extensive and lead to premature primary tooth loss.

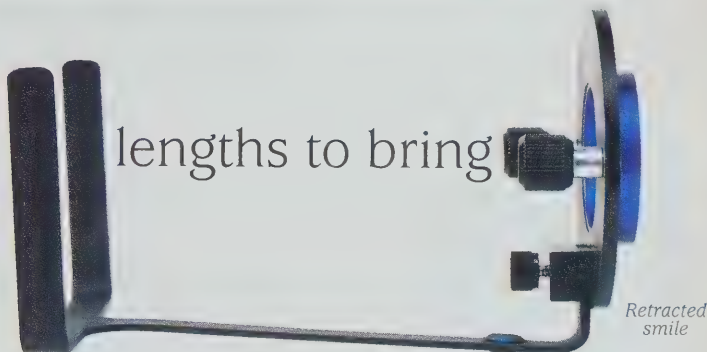
A localized form of PP presents as extensive bone loss of some teeth, with onset prior to age four. Gingival inflammation is minor and there is minimal microbial plaque, but attachment loss seems to be more rapid than that in LJP. The disease appears to be related to defects in PMNs or monocytes, but not both, and is amenable to frequent pocket and root debridement in conjunction with antibiotic therapy.

The generalized form of PP presents as extremely erythematous gingiva around all teeth and mixed gingival proliferation and recession resulting in gingival clefting.³² Large deposits of supragingival plaque are noted and the gingiva may bleed spontaneously. The teeth are very sensitive and often patients are unable to eat or brush their teeth properly. Onset is at the time of tooth eruption with rapid loss of both hard and soft tissues. It

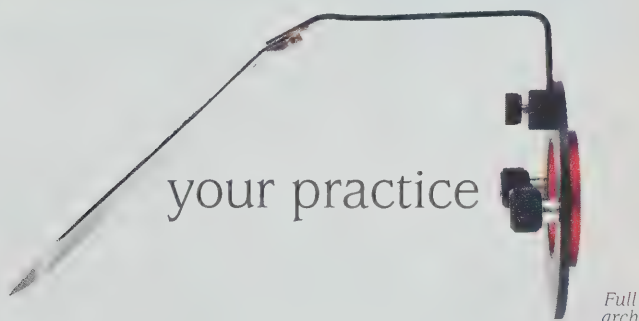
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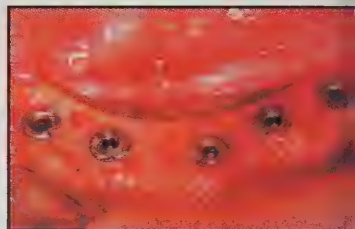
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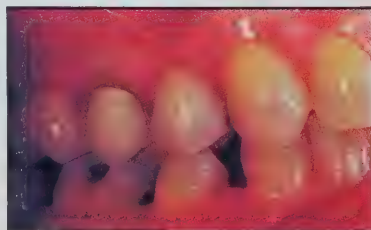
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Fig. 7: Heavy plaque accumulation at initial presentation.

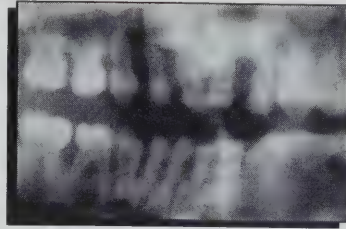


Fig. 8: Section of panoramic radiograph revealing advanced bone loss in primary dentition of patient with Papillon-Lefevre syndrome.

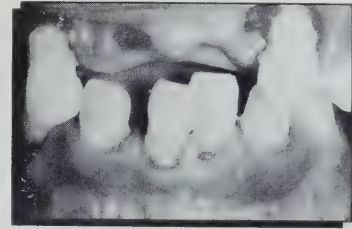


Fig. 9: Clinical presentation after extraction of maxillary incisors.

is often refractory to antibiotic therapy and in such cases the primary teeth should be extracted to avoid infection of the permanent dentition.

Case 1

A 30-year-old woman presented at the UBC graduate periodontics clinic requesting treatment for her gums because her dentist had told her she had "lost bone around her teeth." No periodontal treatment had been attempted in her dentist's office. The patient had been alerted to the condition about five years earlier but did not seek treatment in that period. The patient was healthy and there was no contraindication to dental treatment.

At the initial presentation there was erythema and edema of the marginal and papillary gingiva around the posterior teeth (**Fig. 2**) and generalized bleeding on probing. Pocket depths ranged from 2 to 10 mm around the posterior teeth but only 2 to 3 mm around the anterior teeth. Carious lesions were noted on a number of teeth. Supragingival and subgingival plaque were generalized throughout the dentition but calculus deposits were minimal. Radiographic examination displayed severe bone loss around most posterior teeth (**Fig. 3**). Some may suggest that occlusion was a factor in the bone loss. Although the authors appreciate that there was occlusal wear on some teeth, it is very difficult to attribute an occlusal contribution to this patient's generalized periodontal condition.

The diagnosis was rapidly progressive periodontitis (generalized early onset periodontitis). Contributing to this diagnosis was the availability of earlier radiographs* (**Fig. 4**) which, when compared to

the later films, confirmed there had been extreme bone loss over a seven-year period. Microbiological testing (Evalusite) was completed by pooling samples. The test was positive for low levels of *Prevotella intermedia* but did not show the presence of *Porphyromonas gingivalis* or *Aa*. Although the microbiological testing proved inconclusive, given the extent and rapid rate of the disease, it was deemed appropriate to treat this case as a generalized early onset periodontitis.

As a large number of pockets were very deep, presenting major problems for effective root instrumentation, it was decided to use surgical treatment in conjunction with antibiotics as soon as effective oral hygiene had been achieved. The surgical technique involved internally bevelled mucoperiosteal flaps reflected beyond the mucogingival junction, curettage of residual soft tissue from the periodontal defects, planing of roots and re-positioning of the flaps at the alveolar crests using interrupted sutures. The antibiotic was Doxycycline 100 mg to be taken once per day for 21 days from the day of surgery.¹² Due to stomach upset, the patient discontinued the antibiotic five days after the first surgery and no other antibiotic therapy was substituted, then or subsequently.

Post-surgical assessment has been on a frequent basis up to 12 months from the various dates of surgery. Pocket depth reduction of 3 to 4 mm has occurred, mostly due to a surgically created gingival recession but to a small extent from gain of attachment at the depth of the pockets. Periodontal attachment levels remain stable in a motivated patient who consistently shows highly effective

plaque control (**Fig. 5**). Light root instrumentation and pocket debridement is being undertaken at strict three-month intervals.

Case 2

A four-year-old boy was referred by the British Columbia's Children's Hospital dental clinic having been diagnosed with Papillon-Lefevre syndrome. This rare genetic condition involves palmar-plantar hyperkeratosis (**Fig. 6**) and severe periodontitis affecting the primary and often the permanent dentitions. At the initial presentation there was heavy plaque accumulation on all teeth, with pus, bleeding and exudate from the gingiva around the incisor (**Fig. 7**) and first molar teeth. A panoramic radiograph revealed advanced, generalized bone loss in the primary dentition (**Fig. 8**). The maxillary and mandibular incisors exhibited marked mobility, the maxillary to such an extent that they were extracted immediately (**Fig. 9**).

Further treatment consisted of twice monthly oral prophylaxis and topical application of 0.12 per cent chlorhexidine. The parents were instructed in the daily application of chlorhexidine in an oral irrigator and an electric toothbrush was recommended. A two-week course of metronidazole (250 mg bid) was prescribed. Despite the intense therapy, periodontal breakdown continued and at age five, the patient received extraction of all primary teeth and fabrication of dentures. Following a two-year period of edentulism, the permanent molars began to erupt.

Since then, treatment has consisted of fixed space maintainers, continuing emphasis on oral hygiene, and dental prophylaxis at three-month intervals. Currently,

the patient is 11 years old and the permanent dentition has yet to show signs of periodontal disease. Plaque accumulations are minimal, periodontal sulci are 2 to 3 mm in depth and do not bleed when probed. Microbiological testing of subgingival sites around the maxillary first molars, using direct microscopy and cultures, found no growth from culture and low numbers of nonmotile organisms. DNA analysis was unavailable. Although microbiological testing was not undertaken at the time of the initial diagnosis, it is suggested that the available clinical and microbiological features of the adult dentition reflect a change from a rapidly progressive form of periodontal disease to the present periodontal health. It is assumed that meticulous control of microbiota will offset possible compromised host defense mechanisms which have been suggested as the reason that patients with Papillon-Lefevre syndrome succumb to advanced periodontal disease. ■

*The authors acknowledge this film is of less than optimum quality and report that it was a part of the pre-existing records at the time of referral. It is presented nonetheless to demonstrate the pattern of advanced bone loss at an early stage in the case.

Acknowledgement: Early aspects of the diagnosis and treatment of the patient in Case 2 were provided by Dr. Helen Scott and Dr. David French.

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Dr. John Silver is a periodontist on staff at the faculty of dentistry, University of British Columbia.

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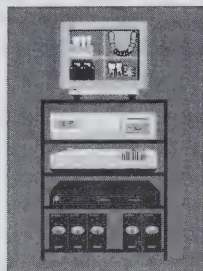
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HI-TECH HIGH CARE



Beyond the Bells and Whistles: Hi-Tech/High Care Dentistry

Imtiaz Manji, B.Sc.

There's something seductive about technology — it's exciting, bold, fresh and constantly reinventing itself. This allure is hard to resist, as last year's Windows '95 hype can well attest. In a time-starved society, where people become impatient simply from waiting at a red light in traffic, it's noteworthy that many people had no problem waiting overnight at retail stores that were about to release Bill Gates's much bally-hooded software.

Don't get me wrong, I'm not suggesting that Windows '95 is anything but a quality product. But I'm wondering how many of those lined-up folks actually knew that. I'd venture to say that some of them were caught up in the technology web — having to have the newest, the latest, the fastest and the most powerful technology available.

This "need" should be tempered by looking beyond the hype and trying to uncover substance. Asking what a technology can accomplish — "What solution does it provide?" — is a good first step. It then becomes a matter of determining whether the goods it will deliver are truly worth the investment.

High tech dentistry is no exception. Any gadget for gadget's sake serves no other purpose than as a short-lived novelty item. Thankfully, most dental teams have be-

come quite adept at separating the wheat from the chaff. Today, there are many excellent products available to enhance the dental experience and, when they are used properly, these technologies can prove to be a win-win situation for both the practice and the patients it serves.

Training & Technology

The only way to ensure that technology will be used, and used effectively, is to set aside time for training. Although the learning curve for many products — from intra-oral cameras to perio-charting — is far from steep, the dental team still needs to devote time to learning the ropes. Otherwise, perfectly good pieces of equipment will sit in the corner and collect dust. (Such a scenario wasn't uncommon when intra-oral cameras were first introduced.)

Training — ideally at continuing education courses and/or through product vendors — is important for all staff, even those who may not use a particular technology on a regular basis. Although dental receptionists don't regularly use clinical tools (e.g. imaging systems), cross-training will give them at least a cursory understanding of the technology in the event that a patient poses questions about it. Staff education is particularly useful when there is a

technological work station in the front desk area, because the receptionist will also be able to display charts and images that were captured in the operator or consultation room and, thereby, continue to communicate with patients in an enhanced way.

More than anything else, technology has underscored the need for professional development. Team members who embrace continuing education and learn about new technologies will be rewarded with interesting jobs, more time for patient care, marketable skills, and curriculum vitae which will make them valuable resources for the dental practices of the 21st century. In addition, the technologically astute dental team can be proud to represent a practice which is reinvesting in itself to provide the best possible service to patients.

The upkeep of knowledge is ultimately the responsibility of each individual. However, because remaining up-to-date is of benefit to both the dentist and the dental team, I suggest that practices work out an appropriate arrangement for continuing education. Many dentists pay for courses if the staff members devote their time to attend, and this partnership in knowledge seems to work quite well.

Patients and Technology

Although it is important that staff members know how to use the technology in the dental office, the technology itself isn't really for them. Rather, it's for the patients and for the practice's relationship with them.

So what do patients get out of a high tech practice? You'll read more about that later, in the descriptions of some of the different technologies, but suffice it to say that patients get a great deal out of practices that invest in technology.

One of the greatest benefits to patients is a psychological one. Dental patients are more educated than they've ever been and many of them are aware of the high tech aspects of dentistry. It's a real confidence booster for them to see that their oral health providers are remaining current and providing the most up-to-date technology.

What technology also delivers in plenty is an unprecedented medium for communicating dental messages — Marshal McLuhan's "The Medium Is The Message," definitely applies here. Until recent years, the dental team had few tools to enhance their communication with patients; dentistry was largely "invisible" to patients and, therefore, the discussion of diagnoses and treatment options was an ongoing challenge.

But dental technology has changed all that. From multi-media patient education systems and intra-oral cameras, to personalized videos and imaging systems, dentistry has cultivated a "seeing is believing" quality. These tools have the power to enhance the dental team's communication skills — namely their ability to articulate value, create trust among patients and encourage them to proceed with recommended treatment. Having this highly visual technology on hand is a plus for all patients, but it is particularly important for the younger generation who have been raised on a diet of Nintendo and MTV.

Although communication has been greatly enhanced with the use of technology, it's important for dental teams to remember that

technology is an educational tool, not communication in and of itself. Real live people are still needed. In the area of cosmetic dentistry, for example, the dental team has to "sell" the concept of bleaching, but multi-media systems can enhance a discussion on the subject and instruct patients on how to use bleaching at home.

Technology is giving patients and practices the opportunity to work together for improved oral health. Dental teams have better tools for diagnosing and explaining treatment options, and patients can make better informed decisions about their treatment. It's truly a win-win scenario.

The Technology Tools of the Trade

Let's take a tour of a hypothetical dental practice which has incorporated high tech dentistry, and have a closer look at what we might find.

There are many reasons why a patient might choose this practice — perhaps the dentist has an outstanding reputation, or the practice is well-located and has extended hours, or maybe he or she has been referred by a friend. Whatever the case, once the patient arrives on the practice's doorstep, it's up to the dental team to make this a successful relationship. Technology is one way to enhance relationship-building — it shouldn't be used to dazzle patients but to engage them in their oral health, and to improve the diagnostic and clinical skills of the dental team.

When the patient enters the reception area he or she will find a new feature among the usual backdrop of chairs and magazines — a user-friendly patient education system (PES) such as a touch-screen monitor that plays a continuous CD depicting different dental procedures and their benefits to the consumer. This PES can also be used as a dynamic, electronic brochure for the practice, communicating everything from staff profiles, to recent continuing education courses, to before-and-after images.



Fig. 1: Work station.

If the PES isn't in a separate area, the volume should be turned off — or very low — out of respect for other patients who may not want to listen to it. Even when it's soundless, the PES still provides a stimulating point of interest in the reception area. This practice may find that when patients who have viewed the PES arrive in the operatory they will ask, "Does that tooth whitening procedure I saw on your TV really work?" This type of question leads easily into a discussion of additional procedures that the patient may want more information about, as a direct result of the use of a PES.

In the operatory, the patient will notice a clean, uncluttered, modern environment. The patient's eyes will be drawn to the clinical work station — an intra-oral camera, monitor, computer and optional devices such as a printer, graphics tablet, etc. — which sits at the foot of the dental chair.

A clinical work station is one of the most significant additions a practice can make. Its benefits are far-reaching and include a paper-reduced office, restorative and periodontal charting that can be done electronically (and can be integrated with the management system, from patient ledgers to practice schedules), and "seeing is believing" dentistry via the intra-oral camera.

For charting purposes, the dentist can call out his or her findings while the dental assistant uses one of a variety of input devices — a

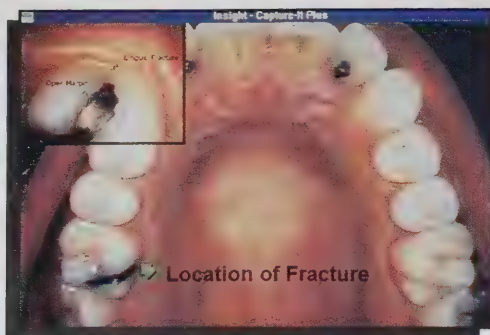


Fig. 2: Intra-oral image with area of concern enlarged.

graphics tablet, a touch-sensitive screen, a voice response system, or a keyboard — to record pre-existing restorations, restorative treatment plans and periodontal recordings.

When the patient undergoes treatment, the assistant can use the selected input device to identify the teeth that were worked on, and then electronically record that treatment in the patient's chart and the ledger at the front desk (thus allowing communication to span the clinical and administrative areas of the practice simultaneously). No paper is necessary and the receptionist doesn't have to re-enter the treatment into the computer. In other words, the person who assisted with the treatment is the one who actually records it, thus avoiding duplication of effort (and the potential for treatment to go unrecorded). The devices that offer a graphic representation also significantly enhance communication at the front desk. (Please note that you should contact your licensing authority regarding the legal implications of relying solely on electronic records.)

Intra-oral Cameras

The jewel of the clinical work station is the intra-oral camera. Few other technological tools can rival its impact on the dental environment. Thanks to the marrying of fibre optics, wand-like cameras and high resolution color monitors, intra-oral cameras enable patients to share the dental team's perspective of the patient's mouth. The results of dramatically magnifying the teeth and gums, and projecting these images onto a screen, include improved diagnoses, bet-

ter educated patients, easier case reactivation, enhanced continuing care appointments and increased acceptance of treatment recommendations. (An intra-oral camera may also accelerate the insurance companies' approval of treatment.)

It's nothing short of revolutionary to have a tool that performs a veritable show and tell for patients. They no longer have to rely solely on the dental team's verbal communication skills (although these must remain sharply honed). Now there is a visual medium which supports the team and gives patients the "straight goods" so they can decide how they would like to proceed.

The clinical work station allows images of all types (intra-oral, imaging, chart, radiovisography) to be stored in electronic folders so that they can be recalled at any time (Fig. 1). This is particularly useful for the dental team because images from previous appointments can be retrieved, shown to patients and discussed from virtually anywhere there is a work station. Such a tool allows patients to visually compare what their mouths looked like both before and after treatment, thus helping them to feel more positive about making payment.

Once a clinical work station is integrated into a practice, the dental team often wonders how they ever managed without it. For hygienists, it quickly becomes indispensable because periodontal charting can be completed hands-free, with voice activation, and areas of concern can be captured on the screen for the dentist to examine (Fig. 2). Again, the hygiene team can compare charts of a specific area from one visit to the next, thereby giving the patient a whole new understanding of oral hygiene and health, and motivating him or her to continue with treatment.

When patients are able to view the "before and after" images of their mouths, they have tangible

— and powerful — evidence that their oral health is benefiting from treatment. When you create value for patients, it is easier for them to part with their discretionary income, and to become a natural source of referrals.

Digital Radiography

X-rays are also being transformed by technology. Today, there is a movement toward filmless or digital radiography, which uses electronic sensors instead of chemical emulsion film. Although there are some concerns with image sharpness, this technology has many benefits, from allowing dental teams to significantly reduce patient radiation exposure (the media and consumers have been demanding ever-lower exposures even though the present levels aren't considered harmful), to producing images which can be viewed on the work-station monitor where they can be stored and enhanced for better diagnostic capability.

Time and money are also saved with this method because there is no darkroom developing (and, therefore, no need for a darkroom, chemicals or film), duplication is very quick, and x-rays can be read instantaneously. The most important benefits are probably those that aren't quantifiable, such as the fact that dental teams like the technology and it's proving to be a star in patient education and treatment explanation. Although digital radiography is not yet mainstream in dental practices, it is destined to be soon.

Cosmetic Imaging Systems

Another example of technological wizardry that you will likely find in the consultation room or operatory is a cosmetic imaging system. Today, imaging systems are affordable, user-friendly (all the systems on the market are now offered in a Windows platform) and boast the ability to build practices. When they are used in advance of treatment to show the patient a representation of what their new smile will look like, the images have untold benefits. Whether the patient is considering



veneers, bonding or bleaching, a cosmetic imaging system has the potential to enhance case presentations, expose patients to the power of cosmetic dentistry, improve case acceptance and thereby bring additional revenue into the practice.

Going High Tech

The technological tools of the dental trade don't end with the above examples. There are all sorts of products on the market, from those that help dental practices with the business side, to those that facilitate the clinical aspects of dental practice, to those that marry the two. Regardless of which technologies you choose, there are certain universal truths that you should keep in mind.

Technology is a tool, which, when used properly, can be very powerful in its ability to stimulate

dental teams, enlist patients in their oral health, and build thriving practices. But it isn't a replacement for anything or anyone — a practice must be highly organized, communicative, efficient and knowledgeable before, during and after it goes high tech.

Technology is not to be feared. It is here to stay, and becoming more user-friendly all the time — just look at the Internet and the powerful role it's playing in communication among dentists, suppliers, specialists and professional associations. There are a myriad of home pages geared for the dental market, from those offering clinical information to those offering business advice.

Resisting high tech by burrowing in the dentistry of yesteryear isn't an option. Patients expect practices to be current, practices expect their employees to be en-

gaged in continuing education, and professional bodies require that certain minimum standards of proficiency be maintained.

Finally, as a dental team, take the time to integrate technology into your practice and to train yourselves on it. This point cannot be emphasized enough because it is what will lead to better, more interesting jobs and will make staff members extremely valuable to their present and future employers. Familiarity breeds comfort with technology, and it's also what determines whether technology will be a worthwhile boon or a wasteful bust for your practice. ■

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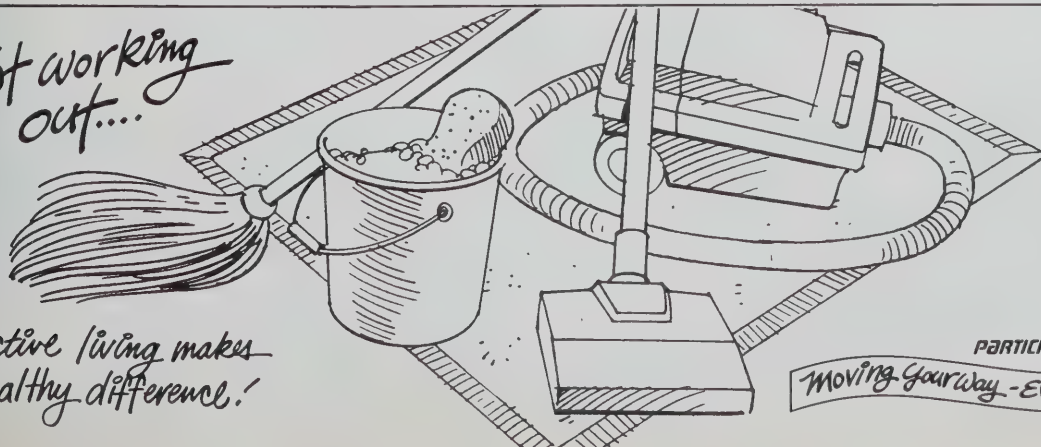
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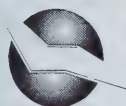
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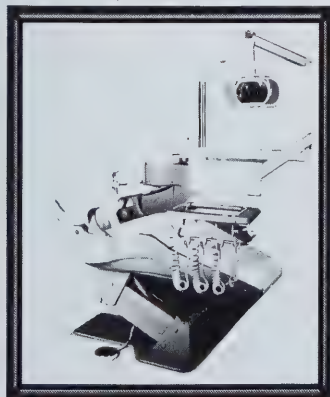
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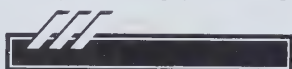
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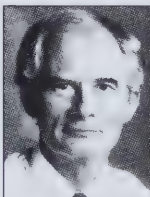
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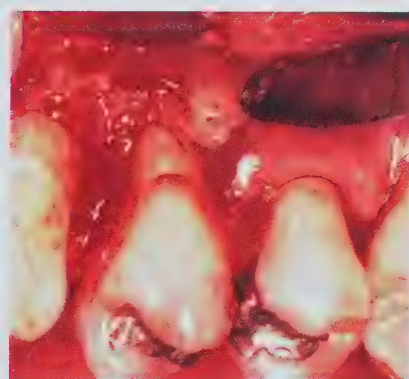
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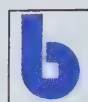
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References: 1. Hench LL. *Advanced Ceramic Materials*. 1986;1(4):306-310. 2. Hench LL. *Bioactive Ceramics: Theory and Applications*. Presented at the 7th International Symposium on Ceramics in Medicine; July 28-30, 1994; Turku, Finland. 3. Low SB. *J Applied Biomaterials*. 1992;3:123-129. 4. Felner AE, Hartigan MS, Low SB. *Compend Cont Educ Dent*. 1992;932, 935-938. 5. Oonishi H, Kushitani S, Yasukawa E, et al. Bone growth into spaces between 45S5 Bioglass*. Presented at the 7th International Symposium on Ceramics in Medicine; July 28-30, 1994; Turku, Finland.



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† "Listerine helps reduce gingivitis (minor inflammation of the gums caused by plaque above the gumline) when used in a conscientiously applied program of oral hygiene and dental care." CANADIAN DENTAL ASSOCIATION. *Gingivitis was evaluated using the Modified Gingival Index.

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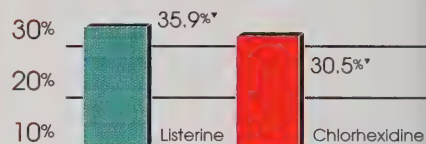
1. Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. J. Clin Periodontol. 1990;17:575-579

2. Data on file, 1995

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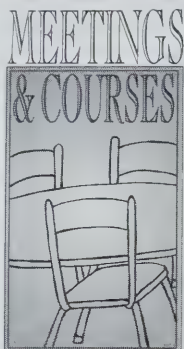
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INTERNATIONAL

September 28 - October 1

FDI 1996 — 84th World Dental Congress in Orlando, Florida. Contact Laura Stephenson. Tel.: (613) 523-1770 ext. 246 or 1-800-267-6354.

October 4-5

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International Conference on Stress and Health — ISMS 6 in Sydney, Australia. Contact F.J. McGuigan, Institute for Stress Management, 10455 Pomerado Rd., San Diego, Calif. 92131. Tel.: (619) 635-4698, or fax: (619) 635-4669. Internet: NOSTRESS@sanac.USIU.edu.

November 27-30

5th Pakistan International & 18th National Dental Conference in Karachi, Pakistan. Contact the College of Dental Surgery, Liaquat Medical College, Jamshoro, Hyderabad, Sindh, Pakistan.

December 6-7

Symposium — 20 Years in Periodontal Local Drug Delivery: Current Applications and Future Trends in London, U.K. Contact the Conference Manager (Dental), The Medicine Group (Education), 62 Stert St., Abingdon, Oxfordshire, OX14 3UQ, U.K. Tel.: + 44 1235 555770, or fax: +44 1235 554691.

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October 1-6

32nd Annual Meeting of the Canadian Academy of Endodontics in Kelowna, B.C. Contact Dr. Froese. Tel.: (604) 763-6636, or fax: (604) 763-1124.

October 3-5

Canadian Association of Orthodontists Annual Scientific Session, in Toronto, Ont. Contact Diane Gaunt. Tel.: (416) 491-3186, or fax: (416) 491-1670.

October 4

Why Are Men So Strange and Women So Weird / Staying Energized in a Draining World. Speaker: Dr. Bruce Christopher. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

October 4-5

Nitrous Oxide Conscious Sedation. Presenter: Dr. David Donaldson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

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Computers in Dentistry. Presenter: Mr. William Hiltz. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 5

Cosmetic Dentistry: New Vistas for the General Practice — Dr. Ross Nash. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

October 11

Seminar on Geriatric Dentistry in Toronto, Ont. Contact Leanne Babineau, Geriatric Division, Department of Dentistry, Sunnybrook Health Science Centre, 2075 Bayview Ave., K-G 130, Toronto, Ont. M4N 3M5. Tel.: (416) 480-4863, or fax: (416) 480-5757.

October 11

The Clinical Management of Temporomandibular Disorders. Speaker: Dr. Jeffrey Okeson. Contact Sharon Ann Bangham, Ottawa Dental Society, 1815 Alta Vista Dr., Suite 103, Ottawa, Ont. K1G 3Y6. Tel.: (613) 523-3876.

October 11-12

International Conference on Computer Applications in Dental Practice and Education at the University of Montreal. Contact Dr. Arto Demirjian, Faculty of Dentistry, University of Montreal. Tel.: (514) 343-6072, or fax: (514) 343-2233.

October 19

Contemporary Restorative Dental Materials (continuing education course) in Wolfville, N.S. Presenter: Dr. Terry Donovan. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

October 19

What's New in Dental Pharmacotherapy? — Ms. Karen Baker. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

October 25-26

Thompson Okanagan Dental Society Annual Meeting and Convention in Kelowna, B.C. Contact: Lane Shupe. Tel./fax: (604) 764-2247.

October 26

Employee or Contract? What Are You? Lecturer: Mike Wilde. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

October 26

Investment Alternatives and Strategies. Lecturer: John Yamamoto. Contact the Northern Alberta

Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

October 26

Jest for the Hell(th) of It: Laughter, Humour and Playfulness in the Workplace. Lecturer: Dr. Chris Johnson. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

October 30

The Changing World of Preventative, Restorative, and Esthetic Dentistry. Speaker: Dr. Richard Simonsen. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

November 1-2

Southern Ontario Surgical Orthodontic Study Group will meet in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632, or fax: (519) 258-2637.

November 2

Treatment Planning Crowns And Bridges For Our Aging Population. Presenter: Dr. Joseph A. Clayton. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 2

Local Anesthesia: Can't Live With It, Can't Live Without It — Dr. Mel Hawkins. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

November 2

The University of Toronto, Faculty of Dentistry's Alumni Association presents its **Alumni of Distinction Dinner and Dance.** Contact Wynona Bardgett. Tel.: (416) 979-4902, or 1-800-74-DDS-UT.

November 15

Current Issues in Pediatric Dentistry. Speaker: Dr. Michael Sigal. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

November 15-16

Dental Update '96. Coordinator: Dr. Andrew Thompson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 16

The Art of Anterior and Posterior Restorations for the 21st Century — Dr. Jimmy Eubank. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

November 21

Consumer Products. Lecturer: Janice Pimlott. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

November 30

Medical Emergencies In The Dental Office. Presenters: Dr. Reginald H.B. Goodday and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 30

Dental Emergencies and Their Management — Course coordinators: Dr. Jeff Coil and Dr. Perry Trester. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

December 7

Forensic Identification: An Overview of Advanced Topics in Legal Dentistry — Dr. David Sweet. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

January 10, 1997

Facial Pain Management Update, 1997. Speaker: Dr. Parker Mahan. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

January 11

Temporomandibular Joint Disorders. Presenters: Dr. A.K. ElGeneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

February 28

Excellence With The Most Recent Advances In Endodontics Today. Speaker: Dr. Clifford Ruddle. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 14

Occlusion and Esthetics — an Oxymoron. Speaker: Dr. Bruce Small. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

May 4-6

2nd Trans-Pacific Endodontic Conference in Vancouver, B.C. Contact Dr. Wayne Pulver, 159 Willowdale Ave., Willowdale, Ont. M2N 4Y7. Tel.: (416) 222-9900, or fax: (416) 222-9901.

UNITED STATES



November 4-5

American Board of Oral and Maxillofacial Radiology — 1996 Certifying Examination in San Diego, Calif. Application deadline was May 3, 1996. Contact Dr. R. Curtis Lundeen, Oral Radiology, Oregon Health Sciences University, School of Dentistry, 611 S.W. Campus Dr., Portland, Ore. 97201-3097. Tel.: (503) 494-8930.

November 14-17

American Society of Addiction Medicine's 9th Annual Conference on Nicotine Dependence in Washington, D.C. Contact ASAM, 4601 North Park Ave., Arcade Suite 101, Chevy Chase, Md. 20815-4520. Tel.: (301) 656-3920, or fax: (301) 656-3815.

January 23-26, 1997

22nd Yankee Dental Congress — "Pathways to Success" in Boston, Mass. Contact Dr. J. Steven Tonelli, General Chair, Massachusetts Dental Society, 83 Speen St., Natick,

Mass. 01760-4144. Tel.: (508) 651-7511.

April 5-8

1997 Star of the North Meeting in Minneapolis, Minn. Contact the Minnesota Dental Association, 2236 Marshall Ave., St. Paul, Minn. 55104. Tel.: (612) 646-7454.

June 21-27

International Association of Dentomaxillofacial Radiology in Louisville, Ky. Held in association with the *3rd International Congress on Computed Maxillofacial Imaging*. Contact Dr. Neill Serman, Division of Oral Radiology, School of Dental and Oral Surgery, Columbia University, 630 W 168 St., New York, N.Y. 10032. Tel.: (212) 305-5674, or fax: (718) 601-6836.

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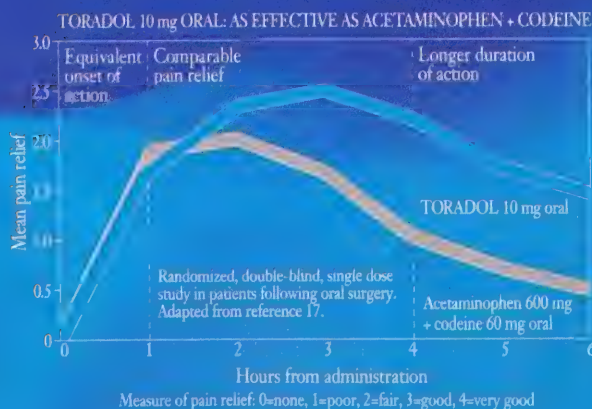
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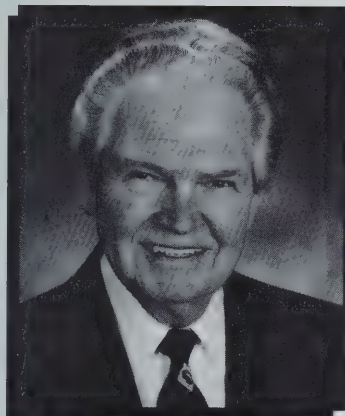
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EDITORIAL

THE CORE OF CDA PROBLEMS



Dr. P. Ralph Crawford,
Editor

Does history repeat itself, or has dentistry, at least the human side of it, never really changed?

That's the question I found myself asking when I considered the thoughts expressed by Dr. M.H. (Harry) Garvin in a January 1944 *Journal* editorial, and the comments made by CDA's leaders during the association's recent annual meeting.

"The Canadian Dental Association delegates' meeting was held in Montreal," wrote Dr. Garvin in his opening paragraph. "One could not help but be impressed with the magnitude of the work facing our association and with the willingness of prominent dental leaders to undertake that work. However, the fact remains that there isn't a prominent committee of our organization which is not either handicapped or hamstrung in its efforts on account of lack of funds. There isn't an officer of our association, also, who isn't curtailed in his activities on account of lack of funds."

Dr. Garvin, the founding editor of this *Journal*, titled his January 1944 editorial: "The Core of CDA Problems." I assume that he penned it following his return from CDA's

24th annual meeting, held in October 1943. Not only the first paragraph, but every word of Dr. Garvin's two-page missive could equally well have been written today.

Having just returned from the 77th CDA annual meeting, also held in Montreal, I am fascinated by the similarities between the problems CDA faced in 1943 and those of today — particularly when it comes to money, and the lack thereof.

Times were tough in 1943. A war was on. Too many men were dying overseas, never to return home. Although jobs were plentiful, wages were pitifully low. My father earned about \$125 a month, and there wasn't much left over, after essentials, for luxuries such as dentistry. Those were the days when the majority of the working poor only went to the dentist when a toothache became unbearable. Dentures were common by age 30 or 40. Both my parents were edentulous by middle age.

One of the main concerns facing the 1943 meeting was the lack of funds in the CDA bank account. About 30 per cent of Canadian dentists were in the Dental Corps at the time, which resulted in a 30 per cent drop in CDA revenues. Nevertheless, a motion to raise CDA dues by \$6 generated a heated debate.

I did some calculations — with a little help from an economist friend — and determined that a \$6 dues hike in 1943 would be equivalent to a \$75 hike in 1996. That's a hefty increase — even in today's terms — but the motion passed.

The dentists sitting around the board table 53 years ago clearly realized the importance of providing dentistry's national body with sufficient funds to do its job. Like Dr. Garvin, they believed in a strong, unified CDA, and praised the dentists who shared their vision.

"All hail to those who see visions, who picture clearly what it

means to have a strong Canadian Dental Association backing them in all their endeavors, blazing the trail into the unexplored field of the future practice of dentistry and representing them before all governments ...," wrote Dr. Garvin. "[CDA is] the only organization capable of handling the many problems facing the practice of dentistry in Canada in these days."

Have things changed very much over the last 50 years? I think not. These are not easy days. We may not be fighting a traditional war, in trenches and on beach heads, but the world is in the midst of an economic, social, and political war that isn't showing any signs of coming to an end.

For two days in Montreal, I watched the CDA board of governors deliberate and discuss a long list of concerns, from dental amalgam to managed care. Many of the issues have changed since 1943, but one of CDA's core problems — adequate funding — has never been resolved.

A line from the preamble of the 1997 CDA budget bears this out: "One of the first realities of the budget review was that there was, quite simply, insufficient funding to accomplish the task, at least in the time frame initially envisioned."

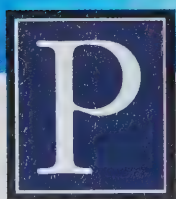
Nevertheless, by the end of CDA's 77th annual meeting in Montreal, our board had set out a workable course to deal with the problems facing our profession. Like Dr. Garvin, I firmly believe that our board and our national association deserve all the support we can give them — morally and financially.

In the words of the wise who blazed the trail ahead of us: CDA is still "the only organization capable of handling the many problems facing the practice of dentistry in Canada in these days."

*P. Ralph Crawford, BA, DMD
Editor of the Journal of the
Canadian Dental Association*

Journal

September/
Septembre
1996
Vol. 62
No. 9



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The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1996-97 quiz will appear in the June 1997 issue of the *Journal*. Answers to the quiz will be published in the August 1997 issue. Dentists who complete the quiz may be eligible to receive continuing education points, and their names will be forwarded to their provincial licensing bodies for consideration.

Questions 1 through 5 are new questions. The correct answers, rationales and specific references will be provided in the October 1996 issue. Keep all copies of the *Journal* so you can correctly respond to the June 1997 quiz.

QUESTION 1

On a recall examination of a 78-year-old patient, you find lesions on the roots of teeth 1.5, 1.6 and 1.7. Each lesion is soft and shallow with a surface defect of not more than 0.5 mm in depth. You would

- (1) polish the lesion with pumice.
- (2) recontour the root surface, smooth and polish.
- (3) apply topical fluoride.
- (4) introduce chlorhexidine therapy.
- (5) restore the teeth with glass ionomer cement.

- A. 1, 3, 4
- B. 2, 3, 4
- C. 3 and 4
- D. 5 only

QUESTION 2

Which of the following tissues is/are at risk when performing vital bleaching procedures for a discolored tooth?

- (1) enamel
- (2) dentin
- (3) gingiva
- (4) pulp

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4

- D. 4 only
- E. All of the above.

QUESTION 3

Which of the following will prevent cross-infection in the dental office?

- (1) Cold disinfection of burs.
- (2) Disinfection of water lines.
- (3) Wiping air/water syringe tips with isopropyl alcohol.
- (4) Autoclaving of handpieces.

- A. 1, 2, 3
- B. 1 and 3
- C. 2 and 4
- D. 4 only
- E. All of the above.

QUESTION 4

Which of the following anesthetic solutions is the most appropriate for local anesthesia in a child weighing 40 lbs?

- A. 2 per cent lidocaine with 1:100,000 epinephrine (3.6 cc).
- B. 3 per cent mepivacaine plain (3.6 cc).
- C. 4 per cent prilocaine plain (3.6 cc).
- D. Any of the above.

QUESTION 5

The most likely cause of unsuccessful endodontic treatment of a maxillary first molar is failure to detect a

- A. second canal in the mesio-buccal root.
- B. second canal in the disto-buccal root.
- C. second canal in the palatal root.
- D. canal in an extra root.

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Bisco, Colgate, the Fowler Pearce Partnership (ScotiaMcLeod), Nobel Biocare and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education credits required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education credits.

Funding for the SLSA program has been provided by:

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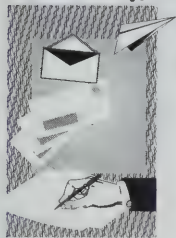
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LETTERS



Oralife

In the July 1996 *Journal*, under the heading "Oralife," a letter from Dr. Arthur A. Galwin appears which disturbs me greatly (Letters 62(7):539-542, 1996). As a member of a minority, unsupported "anecdotal sources" which cannot be upheld, supported or vindicated, still prove frightening to me. As a dentist for 35 years and a consultant and advisor to the insurance industry for 15 years, I cannot help but feel that Dr. Galwin's unsustained innuendos concerning the portrayal of dentists and dentistry by insurance companies (and I presume by your placement of the letter, that this includes Oralife) have no place in a journal representing an organization that refers to itself as a "focus of unity for the profession."

I challenge Dr. Galwin to offer a single quote or reference in substantiation of his comments, which are simply fallacious and deceptive. Failing this, I feel a retraction by Dr. Galwin is in order.

Further on in his letter, Dr. Galwin sadly shows the level of his knowledge regarding prepaid dental services when he states that an unreferenced quote ostensibly originating from "managed dental care" promotion referring to "plans to make dentistry more affordable" implies that dental costs are "exorbitant" and, by extension, casts aspersions on the dental profession.

Well, Dr. Galwin, I have news for you: dental costs are the least controlled of health benefit expenditures. Without change we will all

be in trouble very soon. This steady and burgeoning rise has lead employers, not insurance companies, to reduce benefits, and to request benefit plans which now allow employees to opt out of dental coverage entirely, and to even cancel employee dental coverage completely. 1996 was the first year in my memory where fewer Canadians had dental coverage than the year before — a threatening (to dentists) statistic. A plot by the "powerful insurance health interests?" — hardly. Dental Wellness Programs, such as Oralife's, attempt to keep costs under control without a reduction in necessary services, while retaining freedom-of-choice of one's provider. Dr. Galwin, unfortunately, cannot see the forest of inflationary spiralling of dental costs for the six-month recall "tree."

It's time we realized that prevention resulting in a reduced need for dental services is the only financial salvation available to us. We now know the causes and prevention of most dental disease. We're simply going to have to use that knowledge. This may result, for some, in a loss of earnings. But it's time we stopped blaming the messenger and started educating, not only the public, but our own fellow professionals. Change isn't coming. It's here. Now. All we have to do is look at the medical profession to see our potential future. In Ontario, our physicians are staring capitulation in the face. Right now, I don't like it any more than you do, Dr. Galwin, but the sooner that we recognize that the drill 'n fill period is over in dentistry, the better. Prevention and conservation are our only hope.

Gerald J. Leavens, DDS
Toronto, Ontario

(Editor's Note: We believe it is important to inform readers that Dr. Leavens' name appears in Oralife's January 1996 preliminary prospectus as a member of the company's managed care advisory board, and is referred to as a "dental consultant

to several Canadian insurance companies. Dr. Leavens is a consultant to Oralife on the development of the GO analytical software and has participated in the design and implementation of fee-for-service dentistry for many years.")

I was most pleased to read the responses to Dr. Brookfield's column (Letters 62(7): 539-542, 1996) in the July 1996 issue of the *CDA Journal*. Kudos to *CDA Journal* ethics.

I have not been approached by or communicated with the Oralife Group in any way. In fact, aside from Dr. Brookfield's May 1996 column in the *CDA Journal*, the only other time I came across the Oralife Group's name was in the business section of *The Toronto Star*, in which it was announced they were going on the stock market.

I wish to take exception with many of the remarks voiced by Dr. Richard Ten Cate, chairman of the Oralife Group, and formerly dean of the faculty of dentistry, University of Toronto.

Dr. Ten Cate also discusses how dentists are surgically treating disease that can just as easily be treated with an antibiotic. This is, of course, a gross oversimplification. Dr. Ten Cate did not specify generalists or specialists when he mentioned dentists are performing unnecessary surgery. I assume he is referring to specialists. Did anyone raise the issue of lifestyle or patient responsibility when it came to prevention? Does it make sense to spend more money on people who do not care about their oral health than on those who do?

It was also comforting to hear that Dr. Ten Cate's company follows the guidelines demanded by the American Dental Association president before a U.S. congressional committee, but I foolishly thought that we as Canadian dentists already have this. The only way it is going to become an issue for us and the patient is if we get sucked in by people who are in the

dental health management business. Does the public really need another layer of administration to squander more of its dental health dollars?

Canadians may already enjoy the highest standard of dental health in the world. Provincial and federal regulatory agencies and associations have always done yeoman service in safeguarding the public interest, and none of them gain financially from it.

The more players who get involved in the scenario, other than patient and provider, the more the cost of dentistry escalates. Further, I respectfully submit that companies that sell tests for periodontal disease activity and expensive caries preventives, that produce no better results than that attainable by fluoride, chewing gum, and toothpaste, are misleading the public as well as the dental profession. I wonder what effect the promiscuous, widespread use of antibiotics will have on the general population with respect to bacterial resistance emergence and drug allergies.

Dr. Ten Cate, I believe it is time for a little intellectual honesty and correctness.

*Dr. Gerald R. Suess
Toronto, Ontario*

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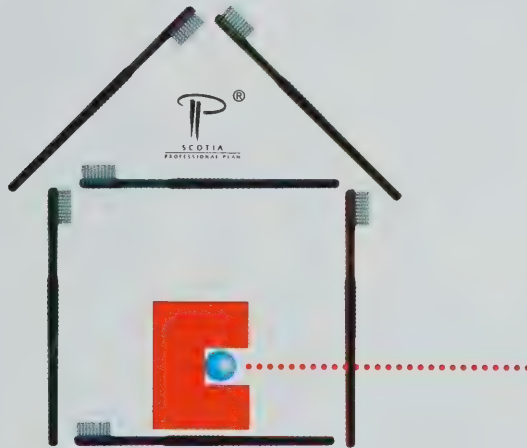


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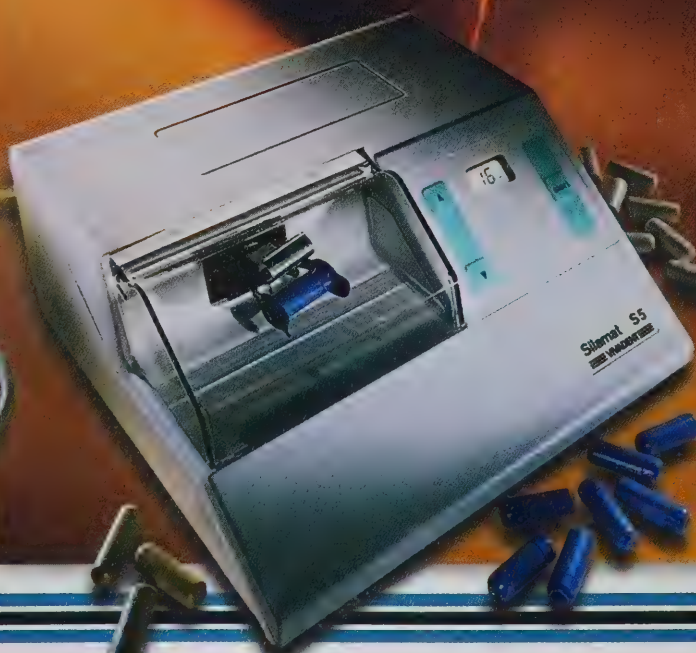
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Meet Dr. Barry Dolman: the New President Of the Canadian Dental Association

Terence L. Davis, BA, Dip. J., CAE

Barry Dolman, B.Sc., DMD

When you listen to Dr. Barry Dolman, you soon realize that he is a man with a mission.

Dr. Dolman, who was elected president of the Canadian Dental Association August 16, hopes to bridge any barriers between Canada's 10 provincial dental associations, and unite the dental profession from coast to coast.

"Canadian dentistry mirrors the country in a lot of ways," said the Montreal dentist. "CDA's individual member dentists have made it clear that they want their national organization and the corporate members to work together to achieve common goals, but often dental leaders aren't listening. My ultimate objective is to end the national-provincial rivalry that exists in organized dentistry."

As a native Montrealer, Dr. Dolman knows the task he has set for himself won't be easy. Living in Quebec through the constitutional wrangling, the language debate and two referendums has been a valuable learning experience.

"I believe that most Quebecers honestly believe that we can live together in harmony and respect each other. There are those who would have you believe that this is foolish, that we are just burying our

heads in the sand and not facing up to reality. But if the politicians would just stop their constant bickering, and put the good of their constituents ahead of their own political ends, my neighbors and colleagues, both English and French, would get along just fine."

The same truth also applies to organized dentistry. A graduate of the University of Montréal's dental program, which is offered in French, Dr. Dolman is fluently bilingual. And he's convinced that people from different backgrounds and cultures *can* work together as a team.

"Early on in my first year of dental school at the University of Montréal, a tight camaraderie formed between the students. It was a sense of sharing goals and supporting each other, as well as a realization that with unity came the strength to overcome any obstacles."

Dr. Dolman believes that the time is now ripe to forge a similar camaraderie between Canada's provincial and national dental leaders. An example of what can be achieved is this past year's historic agreement to link the province's Dentaide claims processing system with CDAnet.

Active in Quebec dental politics since 1985, when he became the

QDSA administrator for the Montreal region, Dr. Dolman knows that his unity objective can only be achieved with a lot of hard work and effort on both sides.

"In 1985, I was encouraged by the Mount Royal Dental Society to seek the position of QDSA administrator for the Montreal region. During the next eight years I was elected to the QDSA executive, and eventually as director of the executive board. These were difficult times in the relationship between QDSA and the Canadian Dental Association. When I became a member of CDA's board of governors and executive council in 1989, my personal mandate was to maintain the lines of communication and begin the slow process of turning the page on the past. My undergrad years had taught me that the key to building support for an organization lay in the respect and trust that the members had for each other, and I made it my goal to achieve this at the national-provincial level."

Like most CDA presidents, Dr. Dolman did not even dream of taking on the profession's top job when he first became involved in organized dentistry. His service to the profession began during his undergraduate years, first with his class

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CDA president Dr. James Brookfield (r) passes the chain of office to incoming president Dr. Barry Dolman (l).

council, and later as vice-president of his school's Alpha Pi Alpha Omega chapter.

After graduating from U de M, Dr. Dolman established a solo private practice in Montreal. Located in a medical-dental building near the heart of the city, his office is close to the University of Montreal as well as two major hospitals. It's a hands-on operation, with an office manager and one assistant on staff, concentrating on individual attention.

During his first 10 years of practice, Dr. Dolman was a part-time clinician and lecturer in U de M's department of community and preventive dentistry. It gave him an opportunity to retain close ties with his alma mater, as well as to help mould the clinical skills and professional careers of the students.

Well-read and well-travelled, Dr. Dolman believes that Canadian dental politicians of all stripes are ready to work together toward common goals and objectives.

By ending the competition for individual members, and eliminating the duplication in the services and programs provided at the national and provincial levels, says Dr. Dolman, dentistry will not only benefit from the same type of camaraderie that he experienced during his undergrad years, but it will be in a good position to confront future challenges.

This change clearly won't happen overnight — old rivalries die hard. But Dr. Dolman believes recent developments in Quebec, and the spirit of cooperation that developed across the country during CDA's "Enough is Enough" campaign, are good starting points. It was this window of opportunity that prompted him to seek the presidency of CDA in 1994.

"My late father used to say, 'If you have something important to do, don't wait until the opportunity is gone.' When I began to see the new direction, and the changes taking place in dental politics in Quebec, I knew it was time to cast my hat into the ring. I view the cementing of relationships that has gone on across this great country during the last three years as an important achievement. The recent CDAnet-Dentaide agreement can be compared to the fall of the Berlin Wall. It could not have happened until now, and it may be the most visible sign of the unity that we're building across organized dentistry," said Dr. Dolman.

"Issues such as managed care and the off-loading of fiscal responsibility by government are just two of the major storms lurking over the horizon for dentistry. These issues can only be dealt with in the context of unwavering support by our

members, both individual and corporate. The silent supporters of organized dentistry must be heard, and those who tag along for the free ride must be challenged."

With four "wonderful" children at home, his practice to run, and a list of favorite hobbies as long as your arm, Dr. Dolman's days are full. He's quick to say that it's really his wife of 23 years, Colette Dolman, who keeps everything on an even keel. She is both the office bookkeeper and "the captain of the Dolman family organization," yet always manages to make time for the office, homework, car pool, family and friends.

"She is someone I can always count on. Without her dedication, and the colleagues with independent practices who care for my patients when I'm away, it would have been impossible to get this far."

An avid golfer, fisherman, scuba diver and sailor, Dr. Dolman enjoys travelling. Perhaps it comes with living in a multicultural city, practising in two (and sometimes more) languages, and generally enjoying life.

"Montreal is still a great city, despite the severe economic times we are going through. Just drop in during one of our many festivals, or dine out along St. Lawrence Boulevard, and you'll understand," said Dr. Dolman.

"Montreal is a quilt of minorities in a European setting. Where else could I walk to work, walk downtown, be close to skiing and lakes, and not spend my life on a highway commuting?"

As a past-chairman of CDA's communications and membership committee, government relations committee, and priorities and issues coordinating committee, Dr. Dolman knows how important issues management — and unity — has become to the future success of both CDA and dentistry. He is pleased with the reorganization that CDA underwent earlier this year, and believes that dentistry's national association is well positioned to meet the challenges that lie ahead.

On the personal side, if there is one thing that Dr. Dolman has

learned living in the tumultuous political climate of Quebec, it's this: "Conflict ends nowhere." Or, "To paraphrase Gandhi, 'the politicians must run to catch up to the people.'"

And Dr. Dolman intends to be at the front of the pack before his term in office is done. ■

Highlights

Born: 1950

Education:

B.Sc., McGill University, 1971;

DMD, University of Montreal, 1975;

Member of Alpha Omega;

Fellow, Pierre Fauchard

Academy;

Fellow, American College of Dentists.

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TORADOL®

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NSAID Analgesic Agent

Toradol (ketorolac tromethamine) is a non-steroidal anti-inflammatory drug (NSAID) that exhibits analgesic activity mediated by peripheral effects.

INDICATIONS

Oral Route: Indicated for the short-term management (not to exceed 5 days for post-surgical patients or 7 days for patients with musculoskeletal pain) of moderate to moderately severe acute pain, including post-surgical pain (such as general, orthopaedic and dental surgery), acute musculoskeletal trauma pain and post-partum uterine cramping pain. (See WARNINGS and DOSAGE AND ADMINISTRATION)

Intramuscular Route: Indicated for the short-term management (not to exceed 2 days) of moderate to severe acute pain, including pain following major abdominal, orthopaedic and gynecological operative procedures. The total duration of combined intramuscular and oral treatment should not exceed 5 days.

CONTRAINDICATIONS

Hypersensitivity: Has been associated with hypersensitivity reactions and should not be used when there is a known or suspected hypersensitivity to the drug. Should be discontinued in patients who develop symptoms of hypersensitivity during therapy. Should not be used in patients with the complete or partial syndrome of nasal polyps, angioedema, bronchospastic reactivity (e.g. asthma) or other allergic manifestations to acetylsalicylic acid (ASA) or other non-steroidal anti-inflammatory drugs. Severe and fatal anaphylactoid reactions have occurred in such individuals.

Gastrointestinal: Should not be used in patients with suspected or confirmed, or a history of, peptic ulcer disease, gastrointestinal bleeding or perforation, or active inflammatory disease of the gastrointestinal system.

Renal Impairment: Contraindicated in patients with moderate to severe renal impairment or in patients at risk for renal failure due to volume depletion.

Haemorrhagic Risk: Contraindicated immediately before any major surgery, and intraoperatively when hemostasis is critical. Contraindicated in patients with coagulation disorders, postoperative patients with high haemorrhagic risk or incomplete haemostasis, and in patients with suspected or confirmed cerebrovascular bleeding.

Obstetrics: Contraindicated in labour and delivery.

Neuraxial Administration: IM route is contraindicated for neuraxial (epidural or intrathecal) administration due to its alcohol content.

Concomitant Medications: Contraindicated in patients currently receiving ASA or NSAIDs. Concomitant use with probenecid is also contraindicated.

WARNINGS

Long-term administration is not recommended.

The most serious risks associated with NSAIDs including 'Toradol' are:

Gastrointestinal Ulcerations, Bleeding and Perforation: Serious gastrointestinal toxicity, such as bleeding, ulceration, and perforation, can occur at any time, with or without warning symptoms. The incidence of gastrointestinal complications increases with dosage and duration of treatment. Elderly and debilitated patients are more susceptible to these complications. To date, studies with NSAIDs have not identified any subset of patients not at risk for developing peptic ulceration and bleeding. Most spontaneous reports of fatal gastrointestinal events with 'Toradol' are in the aged population.

Renal Toxicity: Contraindicated in patients with moderate to severe renal impairment. Acute renal failure, nephrotic syndrome, interstitial nephritis, and renal papillary necrosis have been reported. Elevations of blood urea nitrogen (BUN) and creatinine have been reported.

Hypovolemia should be corrected before treatment is initiated since acute renal failure may be precipitated. Predisposing factors for decreased renal blood flow perfusion include dehydration, sepsis, impaired renal function, heart failure, liver dysfunction, diuretic therapy, and advanced age. Caution is advised in such circumstances. Close monitoring of urine output, serum urea and serum creatinine is recommended until renal function recovers.

Fluid Retention and Edema: Fluid retention, edema, NaCl retention, oliguria, elevations of serum urea nitrogen and creatinine have been observed. The possibility of precipitating congestive heart failure in elderly patients or those with compromised cardiac function should be considered. Should be used with caution in patients with cardiac decompensation, hypertension or other conditions which cause a predisposition to fluid retention.

Haemorrhage: Postoperative haematomas and other symptoms of wound bleeding have been reported in association with intramuscular use. Contraindicated in patients who have coagulation disorders. Careful observation is advised in patients receiving drug therapy that interferes with haemostasis.

Concurrent use with low dose heparin (2500-5000 units q12h), warfarin and dextrans may be associated with an increased risk of bleeding.

In patients receiving anticoagulants, the risk of intramuscular haematoma formation from IM injections is increased.

Hypersensitivity Reactions: The possibility of severe or fatal hypersensitivity reactions should be considered. Counteractive measures must be available when administering the first IM dose. Patients should be questioned for history of allergy to NSAIDs or ASA or for the syndrome consisting of nasal polyps, ASA allergy and asthma.

Use in Pregnancy and Lactation: Not recommended during pregnancy or lactation.

Use in Children: Not recommended for use in children under age 16. Safety and efficacy in children have not been established.

Use in the Elderly: Extra caution and the lowest effective dose should be used.

PRECAUTIONS

Physicians should be alert to the pharmacologic similarity of Toradol (ketorolac tromethamine) to other non-steroidal anti-inflammatory drugs that inhibit cyclo-oxygenase.

Gastrointestinal Effects: Close medical supervision is recommended in patients prone to gastrointestinal tract irritation.

Patients taking any NSAID including ketorolac tromethamine should be instructed to contact a physician immediately if they experience symptoms or signs suggestive of peptic ulceration or gastrointestinal bleeding. These reactions can occur at any time during the treatment. If peptic ulceration is suspected or confirmed, or if gastrointestinal bleeding occurs, Toradol should be discontinued and appropriate treatment instituted with close patient monitoring.

Hepatic Effects: Caution should be observed in patients with impaired hepatic function, or a history of liver disease. May cause elevations of liver enzymes, and, in patients with pre-existing liver dysfunction, may lead to the development of a more severe hepatic reaction. Meaningful elevations of serum transaminases occurred in controlled clinical trials in less than 1% of patients. If clinical signs and symptoms consistent with liver disease develop, or if systemic manifestations occur 'Toradol' should be discontinued. Patients with impaired hepatic function from cirrhosis do not have any clinically important changes in clearance. Studies in patients with active hepatitis or cholestasis have not been performed.

Hematologic Effects: Inhibits platelet function and may prolong bleeding time. Inhibition of platelet function is normalized within 24 to 48 hours after discontinuation.

Blood dyscrasias are rare, but could occur with severe consequences.

Infection: May mask the usual signs of infection.

DRUG INTERACTIONS

'Toradol' is highly bound to human plasma protein (99.2%) however, since it is present in low concentrations in plasma, it would not be expected to displace other protein-bound drugs significantly. Digoxin, warfarin, acetaminophen, phenytoin, and tolbutamide did not alter ketorolac tromethamine protein binding.

In vitro binding of warfarin to plasma proteins was slightly reduced by ketorolac tromethamine (99.5% → 99.3%).

Prothrombin time should be carefully monitored in patients receiving oral anticoagulants concomitantly with ketorolac tromethamine.

Given with heparin mean template bleeding time increased from 6.0 minutes to 6.4 minutes.

Ketorolac tromethamine does not alter digoxin protein binding.

In vitro, salicylates reduce binding of ketorolac tromethamine (99.2% → 97.5%) representing a two-fold increase in unbound 'Toradol' plasma levels.

There is no evidence (animal or human) that ketorolac tromethamine induces or inhibits hepatic enzymes.

Probenecid decreases the clearance of ketorolac and increases ketorolac plasma levels, (3-fold) and half-life (2-fold). Concomitant use of 'Toradol' and probenecid is contraindicated.

Ketorolac tromethamine reduces the diuretic response to furosemide (20%).

Some NSAIDs inhibit clearance of lithium and methotrexate, and increase plasma lithium and methotrexate concentrations and potential toxicities. The effect of ketorolac tromethamine on lithium or methotrexate clearance has not been studied.

Use of ACE inhibitors and NSAIDs may increase risk of renal impairment particularly in volume depleted patients. IM 'Toradol' has been administered with morphine in studies without evidence of adverse interactions.

ADVERSE EVENTS

For adverse events occurring at an incidence of 1% or less during clinical trials, and adverse events reported post-marketing, consult the Product Monograph.

TORADOL TABLETS

Short-Term Patient Studies (Less than two weeks)

Incidence Between 4 and 9%: Nervous System: Somnolence, insomnia **Digestive System:** Nausea

Incidence Between 2 and 3%: Nervous System: Nervousness, headache, dizziness **Digestive System:**

Diarrhea, dyspepsia, gastrointestinal pain, constipation **Body As A Whole:** Fever

Long-Term Patient Study (Approximately one year)

Incidence Between 10 and 12%: Digestive System: Dyspepsia, gastrointestinal pain

Incidence Between 4 and 9%: Digestive System: Nausea, constipation **Nervous System:** Headache

Incidence Between 2 and 3%: Digestive System: Diarrhea, flatulence, gastrointestinal fullness, peptic ulcers

Nervous System: Dizziness, somnolence **Metabolic/Nutritional Disorder:** Edema

TORADOL IM

Incidence Between 10 and 13%: Nervous System: Somnolence **Digestive System:** Nausea

Incidence Between 4 and 9%: Nervous System: headache **Digestive System:** vomiting

Injection Site: injection site pain

Incidence Between 2 and 3%: Nervous System: sweating, dizziness **Cardiovascular System:** vasodilatation

DOSAGE AND ADMINISTRATION

Adults:

Oral: Usual dose is 10 mg every 4 to 6 hours as required. Doses exceeding 40 mg per day are not recommended.

Maximum duration of treatment is 5 days for post-surgical patients and 7 days for patients with musculoskeletal pain.

Intramuscular: Usual initial dose is 10-30 mg, according to pain severity. Subsequent dosing may be 10 mg to 30 mg every 4-6 hours as needed. The lowest effective dose should be administered.

IM administration should be limited to short-term therapy (not over 2 days). Total daily dose should not exceed 120 mg. If supplementary analgesia is required, a concomitant low dose of opiate can be used.

Patients Under 50 kg, Over Age 65 years, or With Less Severe Pain at Baseline:

Oral: Lowest effective dose recommended.

Intramuscular: Lower end of the dosage range recommended. Initial dose 10 mg. Total daily dose should not exceed 60 mg.

Impaired Renal Function: Not recommended for patients with moderate to severe renal impairment.

Conversion from Parenteral to Oral Therapy: Toradol tablets may be used either as monotherapy or as follow-on therapy to parenteral ketorolac.

Follow-on Therapy: Total combined daily dose, oral + parenteral, should not exceed 120 mg in younger adult patients or 60 mg in elderly patients on the day the change of formulation is made. On subsequent days, oral dosing should not exceed 40 mg. 'Toradol' IM should be replaced by an oral analgesic as soon as feasible.

Total duration of combined intramuscular and oral treatment should not exceed 5 days.

AVAILABILITY OF DOSAGE FORMS

Oral Dosage Forms

Available as 10 mg white round film-coated tablets with one side printed red with 'Toradol' inside bold T and other side with Syntex in bottles of 100 and 500 tablets.

IM Dosage Forms

Also available in 1-mL ampoules (trays of 10) containing 10 or 30 mg/mL.

'Toradol' (ketorolac tromethamine) is a schedule F drug.

For full prescribing information refer to the product monograph. The product monograph is available upon request.

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DENTAL BENEFITS



Practice Management: A Global Approach

James Gagnon

In today's electronic world, where everything moves so quickly, everyone is being solicited from so many different sources at once, and communication in all forms is of the highest importance, organization is critical.

This is certainly true at CDA. As a national professional association in the issues management and information business, maintaining an organizational structure that allows us to respond quickly and effectively to the challenges facing both the profession, and our members in their day-to-day practice, is tremendously important.

The other key to the long-term success of any organization, including ours, is a willingness to review and modify your internal structure in response to the changing times. CDA took this step earlier this year, when we determined that the creation of a new department of practice management support services, responsible for all CDA programs and services that impact on dentists in their day-to-day practice, would put us in a better position to meet the needs of both our individual members and the profession.

This new department will work closely with the steering committee on dental benefits issues, the third-party dental plans committee, and other key committees to manage the issues and programs that impact directly on dentists, such as managed care, dental benefit plans, taxation, CDAnet, and continuing education. As part of this process, the department will strive to establish new relationships, as

well as to expand our existing relationships, with the various large employers, government bodies, insurance industry players, and provincial dental associations which are involved in providing dental benefits to Canadians. We feel that it is of utmost importance to be visible and pro-active in this area, and that we must not distance ourselves from the world surrounding us.

If we are going to be an agent of change, we must communicate directly and effectively with all concerned parties, including patients. The future of Canada's oral health care delivery system is at stake. We can't hide our heads in the sand.

Our CDAnet program is closely related to the whole area of dental benefits. If we can expand the network, and bring more plan providers on board, it will ultimately benefit both individual dentists and the profession as a whole. Because dentistry owns CDAnet, the system can be used as a lever in our future discussions on dental benefits issues, particularly when it comes to setting out the rules of the game with the providers.

Ultimately, I would like to see a situation develop where dentistry, plan providers, employers, government and employees are true partners in the delivery of oral health care in Canada. Rather than one side being told what to do, and how and when to do it, we would communicate with one another, and work together to provide Canadians with the highest possible level of care.

CDAnet, which costs nothing to

dentists except for a small investment in software and hardware, could be a great communication tool for dentistry. It could also allow the profession to capitalize on tomorrow's technology, as well as to have a major say in how plan providers deal with the dentists of Canada.

The department of practice management support services will also work closely with the department of corporate services and CDA's government relations committee in the area of taxation. Promises made during the last election campaign have put considerable pressure on the federal government to make changes to the Goods and Services Tax (GST), which could have negative consequences for dentists. We will monitor these and other tax concerns, including the potential taxation of employer-sponsored dental benefit plans. We will also continue to be vigilant with respect to managed care, as well as the other potential threats to Canada's oral health care delivery system, and communicate dentistry's concerns directly to the various health care groups across the country.

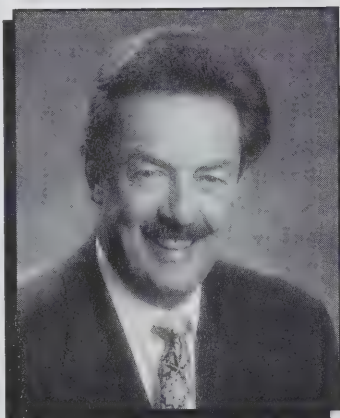
It will be difficult to succeed alone, however. We will need the support of individual dentists, as well as our corporate members, to fully accomplish our ends. I encourage you to participate in CDA's future public campaigns on key issues, to lobby your MP, and to communicate with your patients.

Clearly, issues and priorities related to the day-to-day management of your office will be a great preoc-

cupation of the department of practice management support services. New material and seminars are being developed specifically to meet your needs, taking your concerns and desire for innovative solutions and creativity into account.

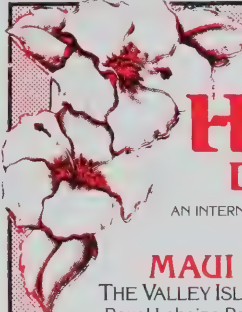
We will try to find new and exciting ways to provide services to the dentists of Canada. We will also communicate with you regularly to ensure that we are in tune to the needs of the profession, and to ask you for positive input and concrete actions.

The new department is already very proactive with the outside world surrounding dentistry. Our goal is to ensure that dentists remain in the forefront of their profession, and that patients always receive the quality of care they need and are entitled to.



Mr. James Gagnon is the director of CDA's new department of practice management support services.

Our approach will be global. We will be part of an active organization that is willing to cooperate, but also one that commands respect. ■



The 17th Annual Hawaiian Dental Forum

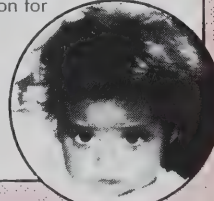
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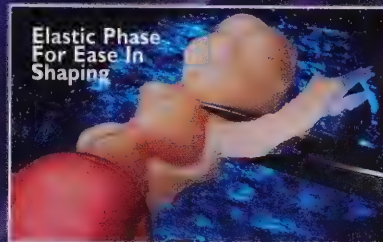
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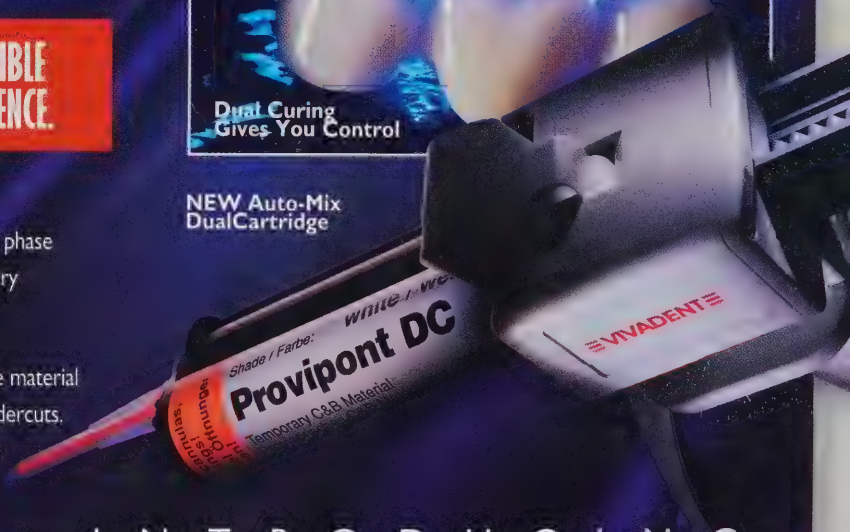
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NEWS UPDATE

CDA, ODA and the RCDSO Clarify Guidelines On Universal Precautions and the Application of the Human Rights Code

Representatives of the Canadian Dental Association (CDA), the Ontario Dental Association (ODA), and the Royal College of Dental Surgeons of Ontario (RCDSO) met in June to discuss the issue of using universal infection control precautions and the application of the Ontario Human Rights Code.

This meeting was called in response to a concern that recent articles in professional journals may cause dentists to believe that it is acceptable for them to modify their infection control protocols as they wish even if there is no scientifically justifiable reason to do so. It was pointed out that this belief could result in dentists running afoul of various provincial laws and regulations. It was also acknowledged that concerns about professional and legal requirements must never be permitted to stifle debate and that critical scrutiny of public policy is encouraged.

As a result of this meeting, the following guidance is offered to the profession.

Endorsement of Universal Precautions

Universal Precautions — is based on the principle that medical histories and physical examinations cannot reliably identify all carriers of blood-borne diseases. Therefore, dental care providers must treat all patients as infective and apply appropriate infection control measures universally to all patients.¹

The CDA, ODA, and the RCDSO representatives recognized that widespread and often sensational media attention about AIDS has led many patients to fear this disease might be transmitted in the dental setting. Responsible dental organizations like CDA, ODA, and the RCDSO, some time ago, developed evidence-based guidelines on the

use of universal infection control precautions. As a result, dentists have been able to use an evidenced-based model to dispel such irrational public fears.

With this focus, CDA led dentistry's process to develop an infection control policy that would protect patients, dental staff and dentists. ODA, the RCDSO and all other provincial dental organizations participated in the policy development workshop. Ultimately, the profession agreed that the application of universal infection control precautions met the test of science in preventing transmission of blood-borne diseases, including AIDS.

During the June meeting, CDA, ODA, and the RCDSO agreed that the existing guidelines on the use of universal precautions provide appropriate, evidence-based direction to dentists and ensure the highest level of protection for the public and the profession. Although they also agreed that there were good and valid science-based reasons to encourage uniformity and universality in the application of barrier techniques, they recognized that the existing guidelines do not specifically direct that every patient must be treated, for the purposes of infection control, in exactly the same fashion despite the fact that the term "universal precautions" is widely assumed to imply this. It was pointed out that the RCDSO guidelines, in fact, make provision for "modifying the infection control protocol, if necessary, when a patient is medically compromised." The RCDSO guidelines, however, add that a patient's medical status should not be used to discriminate against an infected individual by denying dental treatment or

applying special and unnecessary infection control precautions.

Ontario Human Rights Code Based On Science

In concluding that HIV infection was a human rights issue in 1985, the Ontario Human Rights Commission considered comments from the health care community and the scientific evidence about the transmission of the HI Virus. In developing related policy, the commission stated that the critical issue is the effective control of the spread of HIV infection while upholding fundamental values aimed at eliminating discrimination. The commission's policy statement refers to the development and implementation of infection control policies in health care in the following manner: "to be consistent with the Code, health protection and promotion policies should be implemented in as unintrusive a manner as possible and avoid arbitrary, discriminatory treatment of persons with HIV-related illness that cannot be clearly justified in light of current medical or scientific knowledge." While this reference relates specifically to Ontario, the principle holds true in other jurisdictions.

Dentists Encouraged To Use Existing Guidelines

Dentists are held accountable to existing regulatory/professional guidelines and the law of the Human Rights Code. Knowing the law and complying with professional guidelines makes good preventive sense. To receive a copy of existing professional guidelines contact the CDA or your provincial regulatory body. ■

¹ *Guidelines Respecting Infection Control in the Dental Office*, June 1995, RCDSO of Ontario.

Universal Precaution Guidelines Clarified

CDA, the Ontario Dental Association (ODA), and the Royal College of Dental Surgeons of Ontario (RCDSO), have developed a tripartite statement on universal infection control precautions.

The statement reconfirms the support of all three organizations for universal precautions, "based on the principle that medical histories and physical examinations cannot reli-

ably identify all carriers of blood-borne diseases," and advises dentists that they "must treat all patients as infective and apply appropriate infection control measures universally to all patients."

CDA, ODA and the RCDSO agreed to work on a tripartite statement in June, when they met to discuss the relationship between universal precautions and the Ontario Human Rights Code.

"Articles published in the professional literature may have led den-

tists to believe that they can modify infection control procedures, at their discretion, even if there is no scientific basis to do so," said CDA's associate executive director Brian Henderson. "This is concerning. Dentists who fail to follow universal precautions may run afoul of provincial laws and regulations.

"The bottom line, is that dentists are held accountable to the existing regulatory and professional guidelines and the law of the Human Rights Code."

RRSP Alliance Considers 1996 Strategy

CDA and its partners in the RRSP Alliance met in Ottawa this spring to develop a new strategy.

The alliance is concerned that the pension and savings plan tax reforms announced by Finance Minister Paul Martin in his 1996 budget have further reduced the ability of Canadians to save for their retirement, at the same time as the long-term viability of the Canada Pension Plan (CPP) is being questioned.

"There must not be any more changes to the pension system which will increase uncertainty and further undermine Canadians' faith in the pension system," said the alliance in a letter to the CPP Consultation Secretariat. "A review of the Canada Pension Plan must consider its interdependence with health and well-being, and that between the health care system and the system of retirement planning."

Members of the alliance are concerned that Mr. Martin may target RRSPs as a source of new tax dollars next year, as he attempts to shore up the CPP. ■

U of T, Western, To Accept Foreign Dental Students

According to a *Globe and Mail* report, the universities of Toronto and Western Ontario will reserve a limited number of high-priced spaces for foreign dental students this year.

Foreign dental students will pay an annual tuition fee of \$21,000 each to study dentistry at U of T and UWO in 1996, nearly three times more than the \$8,000 fee charged to incoming Canadian dental students.

In an interesting twist, the U of T and UWO dental faculties will allow Canadians who are currently studying dentistry in a foreign school and residing outside of Canada to be admitted as foreign students. The result will be a two-tiered fee structure for Canadians, whereby Canadian dental students who apply to either U of T or UWO from Canada will pay significantly lower tuition fees than those who apply from outside the country.

Saskatchewan Dentists Honored

The College of Dental Surgeons of Saskatchewan honored three distinguished members during its recent annual general meeting.

Honorary membership was conferred on Dr. Fred Wihak, while distinguished service awards were presented to Drs. Jack Niedermayer and Bernie White.

Each of the recipients has given freely of their time, talent and effort over the years, said college president Dr. Gerard Gasser, who made the presentations. He also praised the recipients for their service on multiple committees at the local, provincial and national levels, saying that their efforts will help the present and future membership of dentistry to function in an ethical and professional manner.

All three award recipients are past-presidents of the College of Dental Surgeons of Saskatchewan, and have served on CDA's board of governors and executive council. Dr. Niedermayer is also a past-president of CDA (1989-90). ■



Saskatchewan honors three long-serving members (l. to r.): Dr. Jack Niedermayer, distinguished service award; Dr. Gerard Gasser, president of the Saskatchewan college; Dr. Fred Wihak, honorary membership; and Dr. Bernie White, distinguished service award.

Earlier this year, U of T and UWO doubled their annual tuition fees for incoming Canadian dental students. The fees at both universities increased from \$4,000 to \$8,000. ■

Revenue Canada Introduces Business Number System

Revenue Canada has introduced a new system of business numbers (BNs) to simplify the way businesses deal with government.

Dentists who have a Revenue Canada goods and services (GST), corporate income tax, payroll deductions, or import/export account should contact the department by October 15 to obtain a BN.

According to Revenue Canada, BNs will give dentists, and other Canadian business people, easy

access to the department's business window services and staff. They will also allow business people to obtain information and have their accounts updated with one phone call.

To obtain a BN, dentists should call 1-800-959-8297 (English-language service) or 1-800-959-8299 (French-language service). ■

MP Seeks Suggestions For New Oath Of Allegiance

An Ontario MP is asking Canadians to submit suggestions for a new oath of allegiance to the Canadian flag.

Brenda Chamberlain, the MP for Guelph-Wellington, recently introduced Bill C-102 to "give Canadians their own, official, oath of alle-

Albanian Dental Team Visits CDA Headquarters

A group of Albanian dentists representing the East European Health Fund visited CDA's Ottawa headquarters in June.

During the visit, the group met informally with CDA officials and senior staff to discuss and compare the various modes of dental service provided in Canada and Albania.

The visit was made possible with the support of the Albanian Health Fund, Professional Partnership Program International, and Canadian Programs, Association of Universities and Colleges of Canada. ■



Albanian dentists visit CDA's Ottawa headquarters (l. to r.): Back row, Dr. Arian Pan, coordinator and technical medical translator for the project; Dr. Samendin Gjini, chief of oral and maxillofacial surgery, acting dean of dentistry, University of Tirana; Dr. Pavli Kongo, chief of conservative dentistry, University of Tirana; Dr. Savas Fortis, Montreal; and Dr. Dashimer Karalliu, director of public dentistry of Tirana. Front row, Dr. Ruzhdije Qafmolla, director of stomatology, University of Tirana; Mr. Robert McFarlane, president of East European Health Fund; and Dr. Mirela Bogdani, director of the department of oral health, ministry of health, Albania.

giance to our beloved maple leaf flag."

If the Act is implemented in its current form, it will require a committee of Parliament to consult Canadians on the oath's wording, said Ms. Chamberlain in a letter to CDA president Dr. James Brookfield.

"I am writing to ask that you inform your members, and other Canadians, of this legislation, and to ask them to consider sending me their suggestions for an oath. The oath does not have to be long, I have received a number of suggestions that consist of one line."

Interested dentists can send their suggestions for the oath of allegiance to Ms. Chamberlain's Ottawa office, 152 Confederation Building, Ottawa, ON K1A 0A6, or call her staff at (613) 996-4758. ■

DCF Updates

Dr. Douglas Smith, chair of the Dentistry Canada Fund (DCF) and Dr. Marcia Boyd, chair of the DCF fellowship advisory committee had some good news for Canadian dentistry last month, when they announced the most recent updates to DCF's funds and fellowship awards.

DCF now manages over 30 endowment and developing funds on behalf of the dental profession.

In December, DCF established the Dorothy Peters Endowment Fund through gifts from her family. This fund recently achieved full endowment status, and it is anticipated that it will be used to support education initiatives relating to Newfoundland.

The John King Fund has also achieved full endowment status, by

surpassing the \$10,000 capital threshold. Like the Dorothy Peters Endowment Fund, it will be used primarily to support dental education initiatives in Newfoundland.

More good news involved the Frank Popovich Fund, which continues to break all records for capitalization—the fund balance is now over \$38,000.

It was also announced that the 1995 and 1996 recipient of the Thomas Curry Endowment Fellowship (\$2,000) will be Dr. Robert Hawkins, a second year student in the two-year diploma in dental public health program at the University of Toronto.

Dr. Robert Hawkins

The 1996 Eaton Award for Excellence (\$1,600) will be presented in September to Dr. Cecilia Dong of the University of Manitoba.



Dr. Cecilia Dong

Funds for Needy Students

- Applications for these grants, which are used to assist dental students in severe financial need, have been made to the universities of Montréal (1), Saskatchewan (1), and Toronto (1). The money awarded is derived from the income earned from the Nicholas Mancini, the G.W. Barrett, and the Allan Chantler Endowment Funds.

DCF Fellowships

- Dr. Janice Wilson and Dr. George Zarb, Jr. have been awarded a total of \$9,000 to help complete their courses of postgraduate study. The Henry M. Thornton Fellowship for most meritorious, new application was given to Dr. Suzanne Hébert.

MacLachlan Prosthodontics Endowment Fund

- The guidelines for this fund were revised in 1995-96. Grants

LIBRARY PACKAGE

This month, the CDA Resource Centre has developed a package of articles of interest to dentists on the **INTERNET**.

The package is available to CDA members for \$5, plus applicable taxes, and to non-members for \$10, plus applicable taxes.

NEW ACQUISITIONS

Murphy, J.E. *Mobile dentistry*. Penwell Books, 1996.

Schaper, R.H. *Opening a dental practice*. Penwell, 1996.

Seymour, R.A., Meechan, J.G. and Walton, J.G. *Adverse drug reactions in dentistry*. 2nd ed. Oxford, 1996.

Wilson, T.G. and Korman, K.S. *Fundamentals of periodontics*. Quintessence, 1996.

All of the Resource Centre's texts are available for loan to CDA members — please contact us for fee and loan period information. To order this month's package, a book or video, please contact the CDA Resource Centre at: 1-800-267-6354 (ext: 223); fax: (613) 523-6574; or e-mail: library@cda-adc.ca

totalling \$8,872 have been awarded.

CDA/DCF Dental Students Conference

- Funding of \$11,000 is being made available for this year's event.

Warner-Lambert Fellowships for Dental Teachers, Dental Hygienists Community/Special Projects, and Dental Assisting Teachers

- Dr. Suzanne Hébert, Ms. Nancy Orschel, Ms. Linda Symington and the Ontario Dental Hygienists Association have received a total of \$11,300 for

teaching-related short-term study and book publication.

Wrigley Student Research Awards Program

- Research projects have been approved to take place at the universities of Dalhousie and Manitoba totalling \$7,580.

CDA/DCF Teaching Conference

- Funding of \$15,000 has been approved for this year's conference, which will be held in October at the University of Montreal, and chaired by Dr. Arto Demirjian.

DCF/ACFD Summer Teaching and Management Institute

- Largely supported by DCF, this year's program was held July 6-11 at the University of Western Ontario.

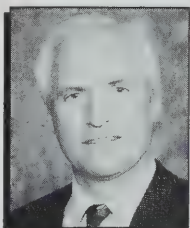
DCF Biennial Research Award

Please note that applications for the prestigious DCF Biennial Research Award (formerly the Canadian Dental Research Foundation Award) are due no later than December 1, 1996. Any graduate dental student is eligible.

DCF extends a very special thank you to the many individuals, corporations and associations whose generous support makes all of these programs possible.

APPOINTMENTS

Nova Scotia Dentists Name President



Dr. Andrew Nette

A former gold medal dentist has been named president of the 106 year-old Nova Scotia Dental Association (NSDA).

Dr. Andrew Nette was appointed NSDA president during the association's annual general meeting this summer. The Wolfville, Nova Scotia, dentist is a 1976 gold medal graduate of the faculty of dentistry at Dalhousie University,

and has maintained a private practice in Nova Scotia's Annapolis Valley since returning from a CUSO-sponsored work project in Botswana in 1982. He is also a part-time faculty member at Dalhousie. ■

OBITUARIES

Dr. Edward G. Derrett (1934-1996)



Dr. Edward Graham (Ted) Derrett passed away March 31, 1996, after a short illness.

Dr. Derrett was born in Winnipeg in

1934. After earning his DDS from the University of Toronto in 1960, he returned to Manitoba to establish a practice in St. James.

In 1966, Dr. Derrett joined the Assiniboine Dental Group as a founding partner. The group's concept and philosophy of modern group practice subsequently became a Canadian model.

Dr. Derrett, who restricted his practice to children's dentistry, was a part-time faculty member in the University of Manitoba's pedodontic department for over 30 years.

Throughout his professional career, Dr. Derrett was intensely involved in dental association affairs. He served as president of the Winnipeg Dental Society in 1968-69, the Manitoba Dental Association in 1975-76, and the Western Canada Dental Society from 1983-85.

Dr. Derrett was inducted into the International College of Dentists in 1982. In 1994, he was awarded honorary life membership by the Western Canada Dental Society.

A keen sportsman who particularly loved both golf and curling, Dr. Derrett earned numerous awards in both sports. He travelled to the Western Canada Dental Bonspiel in Calgary only two weeks before his death, demonstrating the competitive spirit and strength

of character that made him one of Manitoba's most respected dentists.

Donations in Dr. Derrett's memory may be made to the Manitoba Cancer Treatment and Research Foundation, 100 Olivia St., Winnipeg, MB R3E 9Z9.

(Editor's Note: Dr. Derrett's name was incorrectly spelled in the obituary column published in the July issue. The *Journal* apologizes for any confusion or misunderstanding that this error may have caused.)

Moyers, Dr. Robert E: Dr. Robert Moyers, an orthodontist and international authority on human growth and development, died January 8, 1996. He was 76.

Born in Iowa, Dr. Moyers earned four degrees including a DDS and PhD at the University of Iowa.

Dr. Moyers served as a dental officer during the Second World War, assigned to the U.S. Office of

WHAT'S IT?

The "What's It?" mystery item for this month was found at an antique show in a small rural Ontario community. It was displayed with a variety of other dental instruments — primarily old explorers, mirrors and periodontal scalers — which are used by many hobbyists to work on old clocks, model trains and airplanes. The scalers in this set are numbered from one to five, and each has its own place in the velvet lined box. We do not know the purpose of the triangular instrument, and there appears to be several smaller pieces missing. The fascinating feature is that each scaler is imprinted with the words "Box Cemental Curette 1 Platt, 2 Platt etc." If you can identify these curettes, and inform us if they are indeed connected to the famous Dr. Harold Keith Box, we'd like to hear from you.

Dr. Box was a member of the faculty of dentistry at the University of Toronto for over 40 years, and served as research professor in periodontology from 1927 to his retirement in 1956. He was also Canada's first PhD in dentistry, and was world renowned as periodontist, researcher, and author.

Please write to the editor, Dr. P. Ralph Crawford, *Journal of the Canadian Dental Association*, 1815 Alta Vista Drive, Ottawa ON K1G 3Y6. ■



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Strategic Services. During the war, he parachuted behind enemy lines in Greece to operate as the chief medical liaison officer of the Allied military mission to the Greek resistance movement.

In recognition of his distinguished war record, Dr. Moyers was awarded high U.S. military honors, and made an officer of the Greek Order of the Phoenix. He was also named as a Member of the Order of the British Empire.

Dr. Moyer held teaching appointments at the University of Iowa until 1949, when he moved to Ontario to become professor and head of the department of orthodontics at the University of Toronto. Once there, he was instrumental in the establishment of two growth research centres — the Burlington Orthodontic Research Centre, and the Cranio-Facial Anomalies Centre at the Toronto Hospital for Sick Children.

In 1953, Dr. Moyers moved to the University of Michigan, where he became the director and fellow of the Center for Human Growth and Development. The Royal College of Dentists of Canada, awarded Dr. Moyer an honorary fellowship degree in 1982, in recognition of his outstanding contribution to the art and science of dentistry.

Kyte, Dr. John Anthony: Dr. Kyte died suddenly on July 20, 1996. He was 71.

Born in Trinidad, Tobago, Dr. Kyte moved to Nova Scotia, and graduated from St. Francis Xavier University with BA and B.Sc. degrees. At St. Francis Xavier, he was named athlete of the half century and a member of the Nova Scotia Hall of Fame.

Dr. Kyte subsequently earned an M.Sc. from Boston University. He was awarded his DDS from McGill University, in Montreal, in 1952. He had practised in Ottawa, Ontario, since 1954.

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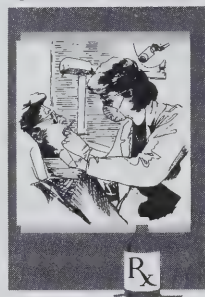
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CLINICAL



Mutans Streptococci Caries and Chlorhexidine

G.H. Bowden, M.Phil., PhD

ABSTRACT

Mutans streptococci, particularly *Streptococcus mutans* and *Streptococcus sobrinus*, can be shown to be highly associated with caries in humans. Together with *Lactobacillus* spp., they are regarded as significant odontopathogens. Because of their association with dental disease, an evaluation of the numbers of Mutans streptococci organisms in plaque and saliva may aid in the diagnosis of caries activity. In conjunction with this concept, control and prevention of caries has been sought by reducing the numbers of bacteria colonizing an individual. Despite the associations between dental disease and Mutans streptococci, which can be demonstrated in groups of people, these methods have not been entirely successful. Because of the wide range of factors involved, counts are not very effective in diagnosing caries activity or risk in an individual. Nevertheless, counts may be used to establish a normal pattern of colonization for a patient, and deviation from this pattern will indicate a change in their oral status, which can be included as a parameter in diagnosis. Accurate and relatively simple commercial tests for counting mutans streptococci and lactobacilli are available. In patients with high caries activity and high counts of mutans streptococci, chlorhexidine may be

employed as an adjunct to other preventive measures. Chlorhexidine delivered in a gel form has been shown to be effective in the control and prevention of caries. Combinations of chlorhexidine with fluoride may be even more effective. Sustained release devices, like varnishes, reduce the numbers of mutans streptococci in a patient's mouth to levels below detection for long periods, but their effectiveness in preventing and controlling caries has not yet been assessed. The decision to use microbiological methods to aid diagnosis, and chlorhexidine to reduce or eliminate mutans streptococci, rests with the practitioner. Although the microbiological tests for caries activity or prediction are not 100 per cent accurate, they can be useful in certain situations. In addition, chlorhexidine as an adjunct in control and prevention of caries has been shown to have value. This short review introduces readers to the literature, so that they will not dismiss microbiology, but make decisions on the use of microbiological methods based on their own experience and the experience of others.

Key words: Mutans streptococci, caries, diagnosis, control, chlorhexidine.

SOMMAIRE

On peut démontrer que les streptocoques, surtout le *Strepto-*

coccus mutans et le *Streptococcus sobrinus*, sont en grande partie associés à la carie chez les humains et qu'ils sont, avec le *Streptococcus lactobacillus*, des agents odontopathogènes importants. Cette association a donné l'idée d'utiliser les nombres de ces organismes contenus dans la plaque et la salive pour faciliter le diagnostic de l'activité cariogène. De plus, on a cherché à réduire et à prévenir la carie en recourant à des méthodes qui abaissent le nombre des colonies chez un sujet. Malgré les associations, qui peuvent être démontrées dans des groupes de personnes, les dénombrements ne sont pas, à cause du grand nombre de facteurs en jeu, très efficaces pour diagnostiquer l'activité cariogène ou le risque de carie chez un sujet. Malgré ce problème, ils peuvent servir à établir la ligne d'évolution normale de la colonisation pour un patient, les écarts de cette ligne indiquant un changement dans son état de santé bucco-dentaire et pouvant être inclus comme paramètres dans le diagnostic. Il existe des tests commerciaux précis et relativement simples pour dénombrer les streptocoques et les lactobacilles. Pour les patients ayant une grande activité cariogène et des comptes élevés de streptocoques, on peut employer de la chlorhexidine comme adjuvant à d'autres mesures préven-



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tives. Le traitement à la chlorhexidine sous forme de gels s'est révélé efficace pour réduire ou prévenir la carie. Les mélanges avec du fluorure peuvent l'être encore plus. Les produits à libération prolongée comme les vernis abaissent pour longtemps dans la bouche des patients les nombres de streptocoques sous le niveau de dépistage, mais leur efficacité à réduire ou à prévenir la carie n'a pas encore été évaluée. La décision touchant le recours à des méthodes microbiologiques pour faciliter le diagnostic et à la chlorhexidine pour réduire ou éliminer les streptocoques appartient au praticien. Bien que les tests microbiologiques pour mesurer ou prévoir l'activité cariogène ne soient pas tout à fait précis, ils peuvent être utiles dans certains cas. En outre, il est démontré que la chlorhexidine comme adjuvant pour réduire et prévenir la carie présente un avantage valable. Ce bref compte rendu présente au lecteur la littérature sur le sujet afin qu'il ne rejette pas la microbiologie, mais prenne des décisions touchant le recours à des méthodes microbiologiques en s'appuyant sur sa propre expérience et celle des autres.

Mots clés: streptocoques, carie, diagnostic, réduction de la carie, chlorhexidine.

Introduction

The association of members of the mutans streptococci family, particularly *Streptococcus mutans* and *Streptococcus sobrinus*, with caries in humans is well established.^{1,3} These organisms will produce caries in experimental animal models, and several longitudinal studies have clearly shown strong associations between the presence and numbers of these organisms in saliva and plaque, and caries experience in humans.⁴⁻⁶

The general acceptance that the mutans streptococci and *Lactobacillus spp.* were major odontopathogens in humans^{2,3} led, not surprisingly, to the use of microbiological tests in diagnosis of caries activity and risk. Currently, it is possible to conduct laboratory and

chairside analysis of samples of saliva and plaque to determine the presence and numbers of mutans streptococci and lactobacilli. In addition to the concept of using microbiology in caries diagnosis, it was logical that the reduction or elimination of these odontopathogens should be attempted as a means of controlling or preventing disease activity. The antibacterial chlorhexidine (Habitane) had been in use in hospitals for decades. Its potential as a useful agent to influence caries activity was addressed almost 20 years ago by Emilson.⁷ Since that time, a considerable quantity of data has accumulated on the use of chlorhexidine, in various formulations, to prevent and control caries through the elimination or reduction of mutans streptococci.

Tests for lactobacilli can also be used in the diagnosis of caries experience and risk. Details of the relationship of this bacteria to caries and the value of current tests for lactobacilli can be found in several excellent reviews.⁸⁻¹⁰ Unlike the mutans streptococci, lactobacilli are relatively resistant to chlorhexidine.^{11,12}

In this short review, I hope to explore the relationship of mutans streptococci to caries; the value of tests for mutans streptococci in caries diagnosis; and the use of chlorhexidine to reduce or eliminate these organisms in patients, and control caries.

Mutans Streptococci and Caries In Humans

At the outset, it should be made clear that the term mutans streptococci identifies a group of species of *Streptococcus* with similar characteristics, originally included as serological types of the species *S. mutans*.² *S. mutans*, in particular, and *S. sobrinus* are most commonly associated with caries experience in humans. Despite these strong associations, some caution is necessary in assuming that high numbers of the microorganism in a patient's mouth implies either high caries experience or high caries risk. Tests for caries diagnosis that are based

only on microbiology are confounded by the multifactorial nature of caries, and the fact that organisms other than the mutans streptococci may cause early demineralization and even cavities in humans.

Longitudinal studies of the development of human caries have occasionally detected lesions where mutans streptococci could not be isolated.^{8,13,14} Although this is a comparatively rare finding, *in situ* models in humans^{15,16} and cross sectional studies of lesions¹⁷⁻¹⁹ have confirmed that demineralization of tooth root and enamel can occur at sites where mutans streptococci cannot be isolated. This has led van Houte and his colleagues to examine the relationship between caries and other non-mutans oral streptococci, which are similar to the mutans streptococci in being acidogenic at low pH.^{3,20} Thus, in a given patient, there is a possibility that a lesion may be the result of activities of organisms other than the mutans streptococci.

A more common finding is that caries-free individuals, or those with very low caries experience, will show high numbers of mutans streptococci in their saliva or plaque, and also that localized caries-susceptible sites with high numbers of mutans streptococci will not develop a lesion.^{4,5,8,21} In these instances, high numbers of mutans streptococci in the oral cavity or at specific sites are not associated with caries development.

Counts Of Mutans Streptococci In Saliva, Plaque and Caries

The outcome of the findings described above is that the relationship between caries and counts of mutans streptococci is not absolute, and the tests for this bacteria are most accurate in groups of subjects with high or low caries experience. It remains true that one of the best predictors of future caries is the current caries status of a patient.²²⁻²⁴ In this case, those subjects with a high incidence of caries can be assumed to have not only the bacteria, but also, the di-

etary, oral physiological and other factors necessary to produce caries lesions.

It is not surprising, therefore, that in subjects with high caries experience, the microbiological test will correlate well with caries experience and caries risk. As microbiological tests are effective in one extreme, so they are in the other. Absence of the factors necessary to cause caries in caries-free subjects includes, very often, no or very low numbers of the mutans streptococci. It is generally agreed that caries diagnosis and prediction based solely on microbiology is most effective in patients with high or low caries experience. The value of microbiological tests in caries has been described very well by several authors.^{3,8-10,22,25}

Are Microbiological Tests Of Any Value In Dental Practice

Given the facts presented above, and the observation that a clinical measurement of current caries status is one of the strongest indicators of caries risk, what value might knowledge of the numbers of mutans streptococci have in dental practice? It is important to remember that the association between the numbers of mutans streptococci and caries risk is most effective in identifying the caries status of groups of people.

Krasse⁸ describes very effectively the problems of the predictive value of bacteriological tests, which can range for positive prediction in high caries groups from 63 to 100 per cent.²⁶ The positive predictive value of the tests becomes less as the caries experience declines. At very low levels, however, negative prediction based on negative or low counts may reach 96 per cent accuracy.²⁷

An appreciation of the ability of different parameters, including microbiological counts, to be used in predicting caries can be gained from a study of 372 adolescent children in Scotland.²² The tests used included microbiological tests (*Lactobacillus*, mutans streptococci and *Veillonella*), as well as measure-

ment of salivary buffer capacity and clinical (DMFS, DS) data. The highest predictive value of selected combinations of the tests for identifying individuals as low, medium or high caries increment was 49 per cent among all subjects. If only microbiology and salivary data were considered, this level dropped to 45 per cent. In this study, these data indicate that, at best, microbiological tests may predict low, medium or high caries increments accurately in 45 per cent of individuals. Bear in mind, however, that we are looking at three caries increment groups, and that the prediction of low caries or high caries individuals can be more effective.

In the above study, for example, the mutans streptococci count accurately predicted 47 per cent high risk and 68 per cent low risk individuals.

Therefore, decisions on the use of microbiological tests in practice depends very much on the dentist appreciating the limitations of the tests and how they might be used.⁸ Dentists in practice have some advantages over those dentists who may screen large numbers of patients in public health situations. Normally, the practising dentist will see her or his patients regularly, and will have a very good longitudinal record of each patient's oral health. Information on the numbers of mutans streptococci and lactobacilli in the saliva of a patient, taken at each visit, will enable the dentist to establish a normal pattern of colonization for a given patient. Thus, a patient may have a high count of mutans streptococci, the levels may be low, or the levels may fluctuate. If the caries experience of the patient is low and does not change, then it seems most likely that the overall conditions in his or her mouth, and other factors like diet, are not generally conducive to caries. The converse may be the case in a subject with high mutans counts and high DMFS and caries increments. Here the oral conditions apparently favor caries.

The influence of other factors in caries risk must be taken into account when considering the results

produced by counting mutans streptococci. Diet is a significant factor in caries, and can influence decisions that are based on microbial counts. Recently, van Palenstein Helderma et al.,²⁸ in a detailed review of caries, diet and mutans streptococci in Africa, Europe and North America, stressed that a cariogenic diet is a most significant factor in caries, and that in subjects with diets containing moderate levels of fermentable carbohydrate, high counts of mutans streptococci may not represent a cariogenic challenge.

The dentist, therefore, can use counts of mutans streptococci to establish a norm for a patient and record changes in the normal pattern as an indicator of a change in his or her oral environment. Any changes need not indicate caries risk, unless other factors are taken into account. A sudden increase in mutans streptococci, together with an increase in consumption of refined carbohydrate by a child, as may happen when they enter school,²⁹ could be seen as a risk situation, and may promote the initiation of preventive therapy, like fluoride. However, in patients with high caries incidence, where fluoride treatment does not appear to be effective, and where the patient has a highly cariogenic diet, high mutans streptococcal counts are a third factor that is indicative of an oral environment conducive to caries. In these instances, chlorhexidine to reduce mutans streptococci could be included in a course of preventive treatment.

Methods Of Estimation Of Numbers Of Mutans Streptococci

The most common means of estimating the level of oral colonization by mutans streptococci is to analyze samples of stimulated saliva. Numbers of the bacteria can be calculated from plate counts in a laboratory, but very effective and accurate commercial chairside tests are available.^{30,31} Colorimetric tests employing indicator broth are also available, but these do not give es-

timations of numbers of organisms.³² An example of an agar test is the Dentoeult system (Orion Diagnostics, Finland).³⁰ In these tests, a slide with an agar medium is dipped into the sample and then incubated in a sealed tube. The numbers of organisms, *S. mutans* or lactobacillus, are estimated from a chart supplied by the manufacturer. All of the tests depend on the use of selective media or selective antibiotic discs on the agar, which will inhibit most oral bacteria, except mutans streptococci and lactobacilli.

An important aspect of assessing the results of these tests is deciding on the numbers of mutans streptococci or lactobacilli that would be regarded as "high" or "low." In earlier studies of subjects with high caries activity, high levels of mutans streptococci were reported when the numbers were 10⁶/mL of saliva, or higher.⁸ However, as the caries incidence becomes lower in some populations 10⁵/mL of saliva or less would be considered "high." The concept of "high" depends very much on the caries experience and other factors of the population that is being tested, and it may be necessary for the practitioner to decide when a level is high for an individual patient, particularly if there is an increase in numbers from the established norm for that individual. This is an important point, because commercial tests may include details of levels that should be regarded as high, which may not apply to all human populations. As with other diagnostic criteria, the practitioner uses his or her experience and expertise in deciding the significance and validity of the result.

Control Of Mutans Streptococci By Use Of Chlorhexidine

All those who have an interest in use of chlorhexidine to control mutans streptococci and caries should consult the excellent review by Emilson.³³ This review covers all the aspects of chlorhexidine treatment, but I will only deal with selected areas here.

In Europe, chlorhexidine has been used in dentistry for over 25 years. Moreover, the number of formulations, including chlorhexidine, that have been tested is wider than those currently available in North America. These formulations include both chlorhexidine gels and sustained-release materials. Currently, Canadian dentists have access to commercial mouthrinses containing chlorhexidine and chlorhexidine varnish.

In hospital situations, the pharmacy may prepare chlorhexidine solutions for oral use. The levels of chlorhexidine that have been used range from 0.05 to 0.20 per cent for mouthrinses, 0.5 to 1.0 per cent for gels used in tooth-brushing or in trays, and 10.0 to 50.0 per cent in varnishes. Mutans streptococci are very sensitive to chlorhexidine, relative to some other oral streptococci and lactobacilli. Thus, treatments with chlorhexidine formulations will reduce their numbers significantly, often below the level of detection in saliva. However, the organisms recolonize the oral cavity after varying periods of time.^{12,34,36,37}

The time of recovery by mutans streptococci varies. It is probably dependent on several factors, including exclusion by other plaque organisms, which recover from chlorhexidine treatment more rapidly.³⁵ This means that more than one treatment may be necessary to maintain a reduction in mutans streptococci for long periods.^{12,34,36,37}

Clinical Use Of Chlorhexidine and Control and Prevention Of Caries

It is important to realize that the reduction or even elimination of mutans streptococci is not synonymous with reduction of caries. However, there are several studies that clearly show that treatment with chlorhexidine and, most particularly, chlorhexidine together with fluoride can be efficient in reducing caries.³³ The most effective treatments to date have been chlorhexidine gels applied by flossing or in trays—brushing with gel is not effective. Although mouthrinses will reduce the num-

bers of the organisms, there is no evidence of an effect on caries. In contrast, chlorhexidine mouthrinses with fluoride are effective in reducing caries, as is chlorhexidine and fluoride applied in gel trays.

Chlorhexidine varnishes effectively reduce the numbers of mutans streptococci, sometimes for long periods (months) of time.^{12,34,36,37} However, little is known about the effect of chlorhexidine varnish treatment on caries, although one study has reported a reduction in root surface caries.³⁸ Treatment of mothers with chlorhexidine fluoride gels,¹⁴ sometimes in combination with other preventive methods,³⁹ has also been shown to reduce both the colonization by mutans streptococci and caries in their children.

Generally, chlorhexidine is not applied continuously, over the long term, as a routine treatment.³³ For example, gel applications in trays may be given on several occasions initially, and then once or twice a year. Chlorhexidine varnishes are usually applied once, and repeated only if the mutans streptococci recolonize or remain above the detection level. In all uses of chlorhexidine, it is usual to monitor the effectiveness of treatment by taking counts of the mutans streptococci in saliva samples.¹⁰

It must be remembered that chlorhexidine can have some side effects in clinical use.⁴⁰ Chlorhexidine will stain teeth, although the stain is easily removed by the dentist. Perhaps more importantly, some patients find the taste offensive, and inflammation of the gingivae may occur in others.

Concluding Remarks

The use of microbiology in dental practice should not be dismissed as being of little value because microbiological methods do not provide a panacea, and may not be appropriate in all cases. There is no doubt that chlorhexidine treatment can affect caries activity and help to prevent caries. Also, counts of mutans streptococci and lactobacilli can be useful to establish a normal microbiological profile for

a patient, and they are also essential to monitor preventive treatments that use antibacterials. The dentist has to realize the limitations of microbiological methods in diagnosis and treatment and, as is the case with other techniques, make a decision for use based on the status of the individual patient.

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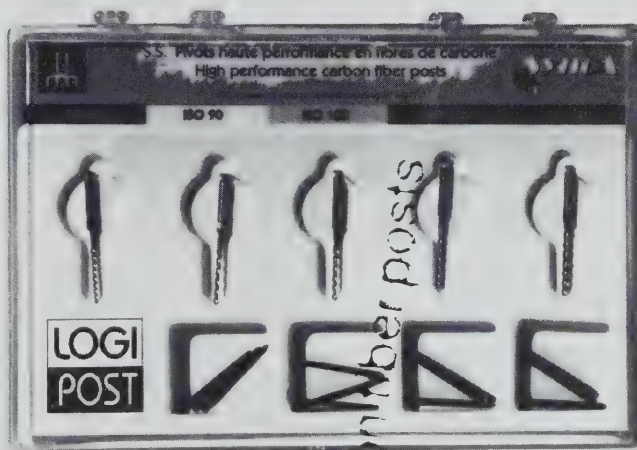
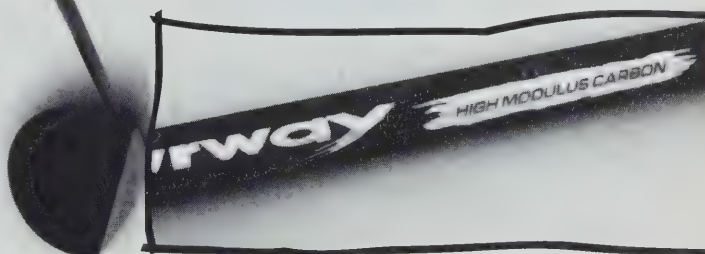
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Comparison of Recommended and Actual Mean Intakes of Fluoride by Canadians

D.W. Lewis, DDS, DDPH, M.Sc.D., FRCD(C)

H. Limeback, B.Sc., PhD, DDS

ABSTRACT

The findings of two separate 1993 reports, one on the actual intake of fluoride by Canadians and the other on their recommended fluoride intake, are summarized and compared. Recent increases in very mild and mild dental fluorosis suggest that the gap between current fluoride intake and recommended intake is narrowing. The daily swallowing of fluoride dentifrice makes a large contribution to the actual total daily fluoride intake, especially in children seven months to four years of age, the age group most susceptible to fluorosis in the anterior permanent teeth. Because of the available data and methods used in each study, the reported actual and recommended fluoride intakes vary greatly both within and between age groups. It is likely that individual variation in fluoride intake also varies greatly. Comparison of the data in the two reports revealed that, for breast-fed infants and nearly all other age groups without fluoridated water, the ranges of the estimates of actual intake are lower than the recommended ranges. However, for formula-fed infants and all other age groups using fluoridated water, the estimates of actual intake greatly exceed the recommended intake, especially for the seven months to four years age group. Ingestion of fluoride at these levels during

tooth development will contribute to dental fluorosis. All of the age groups have fluoride intake estimates below levels at which skeletal signs of fluoride exposure are noticed. Nevertheless, exposure to fluoride should be closely monitored and inappropriate use of discretionary fluorides curtailed.

SOMMAIRE

Dans cet article, on résume et compare les découvertes de deux rapports distincts faits en 1993, l'un sur la consommation réelle de fluorure par les Canadiens et l'autre sur les doses recommandées. Les récentes augmentations de cas de fluorose dentaire bénigne et très bénigne suggèrent que l'écart entre la consommation réelle de fluorure et les doses recommandées est en train de diminuer. L'ingestion quotidienne de dentifrice fluoruré contribue beaucoup aux doses quotidiennes totales réellement consommées, surtout chez les enfants âgés de sept mois à quatre ans, le groupe d'âge le plus susceptible d'être atteint de fluorose aux dents permanentes antérieures. À cause des données et des méthodes disponibles utilisées pour chaque étude, les doses réelles et recommandées signalées varient beaucoup tant dans les groupes d'âge qu'entre eux. Il est probable que les doses de fluorure prises chaque jour par une personne varient

également beaucoup. La comparaison des données des deux rapports révèlent que, pour les bébés nourris au sein et pour presque tous les groupes d'âge ne consommant pas d'eau fluorurée, les échelles d'estimation des doses réelles sont inférieures aux échelles recommandées. Par contre, pour les enfants nourris au biberon et tous les autres groupes d'âge consommant de l'eau fluorurée, les estimations des doses réelles excèdent de beaucoup les doses recommandées, surtout dans le groupe des sept mois à quatre ans. L'ingestion de fluorure à ces taux durant la formation des dents favorise la fluorose dentaire. Pour tous les groupes d'âge, les estimations des doses de fluorure sont à des taux inférieurs où l'on remarque des signes squelettiques d'exposition au fluorure. Néanmoins, il convient de surveiller de près l'exposition au fluorure et de mettre un frein à l'usage inopportun de fluorures discrétionnaires.

Introduction

In 1993, two important reports on fluoride of interest to Canadians were completed. In one report,¹ prepared by officials of Environment Canada and Health Canada of the federal government, the impact of inorganic fluoride on the environment was reviewed, and the current intake

TABLE I

Estimated Daily Intake of Inorganic Fluoride ($\mu\text{g/kg bw/day}$) by the General Population of Canada

Exposure Source	Age Group				
	up to six months	seven months to four years	five to 11 years	12 to 19 years	20 years or more
Food	14-92	22	16	14	30
Breast milk	0.5-1.1	—	—	—	—
Soil	0.03-1.6	0.02-1.2	0.01-0.4	0-0.1	0-0.1
H ₂ O/Fluoride	—	45-77	24-42	17-29	16-27
H ₂ O/Non-fluoride	—	3.1-13	1.7-7	1.1-5	1.1-5
Household products	—	20-60	8.2-20	2.5	1.1
TOTAL					
H ₂ O/Fluoride	*14-93	87-160	49-79	33-45	47-58
H ₂ O/Non-fluoride	*0.5-2.6	45-96	26-44	17-21	32-36

* For the up to six months age group, the estimates are for formula-fed infants, with the remaining ages representing the intake estimates based on the consumption of fluoridated water.

** For the up to six months age group, the estimates are for breast-fed infants, with the remaining ages representing the intake estimates based on the consumption of non-fluoridated water.

Air = 0.01 $\mu\text{g/kg bw/day}$ for each age group is not tabled.

Source: This table summarizes detailed data and explanatory material contained in Table 3 of reference 1.

of fluoride by Canadians was estimated. In the other,² prepared independently by a group of Canadian researchers, the optimal total intake of fluoride by Canadians to maximize dental caries reduction and minimize levels of dental fluorosis was estimated.

The purposes of this paper are (i) to summarize the first report's findings on the environmental impact of fluoride and its estimates of fluoride intake, and (ii) to compare these estimates with those of the second report on recommended optimal intakes. The relevance of this comparison is highlighted by a number of Canadian studies³⁻⁵ that found the prevalence of dental fluorosis, particularly the very mild and mild types, is higher now than it used to be. This suggests that the gap between the current intake and recommended intake of fluoride is narrowing.

Inorganic Fluoride in the Environment

The Canadian Environmental

Protection Act (CEPA)¹ requires that the Environment Canada and Health Canada Ministries periodically assess and report upon substances and chemicals that may be harmful to the environment or constitute a danger to human health. These substances and chemicals are also assessed to determine if they are "toxic" as defined in CEPA. This definition includes consideration of whether these substances and chemicals have or could lead to adverse effects such as:

- immediate or long-term harmful effects on the environment;
- danger to the environment on which human life depends;
- danger in Canada to human life or health.

In 1993, a report assessing inorganic fluorides relative to the requirements of CEPA was published.¹

Inorganic fluorides are released naturally into the environment through the weathering of minerals and as emissions from volcanoes. The amounts of these natural releases were not estimated in

the Canadian report. However, the amounts of man-made (usually commercial) releases into the Canadian environment were estimated. They include emissions from aluminum smelting and steel, phosphate fertilizer, glass and brick production, as well as the fluoridation of some water supplies. Survey data revealed that the releases of inorganic fluoride to the Canadian environment (air, land, water) from the foregoing activities were estimated in 1993 to be in excess of 23,500 tonnes annually.¹

Although details of the findings of this federal report are not provided here, the environmental assessment of inorganic fluoride concluded, in relation to the three criteria of toxicity mentioned above, that: "... inorganic fluorides are entering the environment in quantities or under conditions that may be harmful to the environment. There is insufficient information to conclude whether sulphur hexafluoride is entering the environ-

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Estimates of Actual Fluoride Intake of Canadians

Using the findings of an extensive literature search and some direct survey data regarding the levels of inorganic fluoride in ambient air, drinking water, food, soil, and household products, the federal report estimated the total average daily intake by the general Canadian population in micrograms of fluoride per kilogram of body weight ($\mu\text{g/kg/bw}$) for various age groups of average body weight.¹ When the average amount of fluoride intake reported by different studies for the sources of fluoride in food, soil, water and household products (i.e., fluoride dentifrice) varied, a range of low and high average intakes was reported. These average estimates are found in **Table I** which is merely our summary of a much more detailed and referenced table (Table 3 in the federal report).¹ The low and high range of the total estimates for each of five age groups when the water supply is fluoridated and not fluoridated are listed at the bottom of **Table I**.

A very large contribution to these total estimates for children in the seven months to four years and five to 11 years age groups is attributable to the daily swallowing of fluoride dentifrices and is particularly noteworthy. For example, using the high estimates for the seven months to four years age group, 38 per cent (60/160) and 62 per cent (60/96) of the total high average fluoride intake is from this source (**Table I**).

TABLE II

Recommended and Actual Fluoride Intake Estimates

Age Group	Recommended Fluoride Intake ($\mu\text{g/kg bw/day}$)	Actual Fluoride Intake ($\mu\text{g/kg bw/day}$)
up to six months	3-71 (99)	14-93 (formula-fed) 0.5-2.6 (breast-fed)
seven months to four years	56-81 (105)	*87-160 **45-96
five to 11 years	32-45 (58)	*49-79 **26-44
12 to 19 years	24-33 (—)	*33-45 **17-21
20 years or more	32-41 (—)	*47-58 **32-36

() = upper threshold to prevent moderate fluorosis

* Estimate of actual intake based on fluoridated water consumption

** Estimates of actual intake based on non-fluoridated water consumption

Sources: The recommended estimates are from reference 2 and the actual estimates are from reference 1.

Estimates of Recommended Fluoride Intake of Canadians

Using the same age groups and average body weights as the federal study, a group of researchers working under a federal research contract independently estimated the total daily fluoride intake ($\mu\text{g/kg bw/day}$) of Canadians that would maximize dental caries reduction and minimize the levels of dental fluorosis. The methodology, rationale, validation and findings of this 1993 study have recently been reported,² and will not be repeated here. A range of low and high levels of fluoride intake was also presented in this study, however, the low level was based on an intake of 0.8 ppm F in drinking water and the high on an intake of 1.2 ppm in the water since these two concentrations of fluoride were an inherent part of the epidemiological methodology employed by the researchers.²

Recommended and Actual Fluoride Intake Estimates

Table II presents the low and high estimates of recommended² and actual fluoride intakes.¹ Also included in the recommended intakes for three of the age groups are the upper threshold fluoride intake estimates that would prevent moderate as opposed to very mild or mild levels of dental fluorosis.²

For the breast-fed infants and all other age groups without fluoridated water (except the seven months to four years age group), the estimates of actual intake are lower than the recommended intakes. For the formula-fed infants and all other age groups using fluoridated water, the estimates of actual intake greatly exceed the recommended intakes. This excess is evident in **Fig. 1** which shows for each age group the high estimates of the recommended intakes in relation to the high estimates of actual intakes for those in non-fluoridated and fluoridated

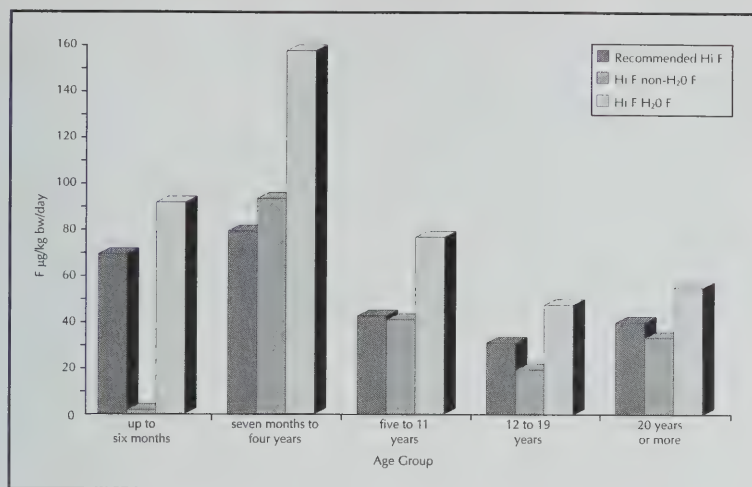


Fig. 1: Recommended High and Actual High Fluoride Intake Estimates

communities. For the zero to six months age group, the breast-fed group was placed in the non-fluoridated water category. Both formula-fed and breast-fed fluoride intake estimates are shown in Fig. 1. For the seven months to four years and five to 11 years age groups, the high levels of actual intake for those using fluoridated water exceed the high threshold levels recommended to avoid moderate dental fluorosis (160 vs. 105 and 79 vs. 58 µg/kg bw/day in Table II).

Discussion

In this paper, we have summarized and compared the latest recommendations for daily fluoride intake² with the most recent published report that estimates the actual current fluoride intake of Canadians in five different age groups (0-0.5, 0.5-four, five-11, 12-19 and 20+ years).¹ Three important general observations about these intakes can be made from the data in Tables I and II. First, the recommended and actual daily fluoride intakes vary greatly according to age group. Second, there would be a large range of fluoride intake within each age group that the minimum and maximum values presented in Table I do not show. Third, variation above and below the fluoride intake levels among individuals within the same age and water fluoridation group would oc-

cur. Although the data of Tables I and II do not show this individual variation in fluoride intake, its occurrence has recently been emphasized elsewhere.⁶

Both of the studies reviewed here attempted to separate out groups of people who live in fluoridated communities from those who do not. However, it has become quite evident that children and adults today are being exposed to fluoride from numerous sources other than drinking water, and that even those in non-fluoridated communities are indirectly exposed to fluoridated water because of the so-called "halo" effect of water fluoridation.⁶⁻⁸

Babies, for example, whose main source of food in the first six months of life is primarily in liquid form, can be exposed to high levels of daily fluoride intake (per kg of body weight) if there are excessive amounts of fluoride in their baby formula.⁹ Thus, one risk factor for children is infant formula that is reconstituted with fluoridated water. Another risk factor is toothpaste: children in the seven months to four years age group are more likely than the other age groups to ingest fluoride dentifrice.^{7,9,10} As shown in Table I, this is the age group that apparently experiences the highest maximum daily fluoride intake, a large part of which is estimated to be due to the ingestion of fluoride dentifrice. Interestingly, this is also the age group most suscep-

tible to dental fluorosis of the permanent anterior teeth because of systemic exposure to excess fluoride.¹¹

When comparing the recommended daily fluoride intakes to the actual intakes, it is important to remember that when these studies were first conducted more than 50 years ago to investigate the anticaries effect of fluoride, the recommended intake was based solely on fluoridated water, the only source of fluoride at the time. Since those studies were completed, many clinical studies have shown that fluorides in toothpastes and mouthrinses, as tablet supplements and in topical applications in the dental office setting are also effective in reducing caries. This widespread use of fluoride in the prevention of dental decay, as well as increases in environmental and food sources of exposure, have apparently resulted in mean daily fluoride intakes that are higher than the recommended mean intakes. This is evident for many of the age groups in Table II. Although this fluoride use has contributed to a dramatic decline in dental caries¹² it has, at the same time, resulted in increased, but usually mild, dental fluorosis.³⁻⁵

The maximum actual daily fluoride intake for each age group in Table I represents only those who are exposed to the maximum levels of each source of fluoride, including fluoride supplements, ingested dental products, ingested foods with high fluoride content and environmental fluoride exposures. Thus, these are truly maximal and perhaps unrealistic estimates since, as described in the original report¹ they are based on the summation of the high mean values of fluoride intake from various studies of each of the exposure sources listed in Table I. Even so, people who have difficulty metabolizing and excreting fluoride have not been included in these estimates. Thus, patients with damaged kidneys, for example, may be exposed to more fluoride than the average person with the same level of daily fluoride intake.^{12,13}



The Environment Canada and Health Canada study concluded that the level of actual daily intake was at least 20 per cent less than the levels at which skeletal changes from fluoride exposure are observed.¹ Although the basis for this conclusion was not specifically presented, it was presumably derived by comparing the maximum daily mean fluoride intake (160 µg/kg bw/day) experienced by children in the seven months to four years age group (Table I) with the lowest intake (≥ 200 µg/kg bw/day) at which one starts to see skeletal effects from fluoride intake¹ (i.e., $200 - 160 \div 200 = 20$ per cent). However, this numerical estimate of a safety margin for fluoride exposure with respect to skeletal fluorosis may be somewhat underestimated since it is based on studies in which the effects of long-term exposure at 200 µg/kg bw/day was not known (i.e., the studies involved adults of several ages in which the actual exposure to fluoride was several years). Even so, it is difficult not to agree with the authors of the federal report who have indicated elsewhere that exposure to inorganic fluoride should be closely monitored because of the small difference between possible maximal intake and the level at which adverse skeletal effects are anticipated.¹⁴

Regarding this 20 per cent safety margin, it is important to stress that it only applies to those children between age seven months to four years living in a fluoridated area who ingest the maximum amount of fluoride toothpaste and are exposed to the maximum of each additional source of fluoride (Table I). All other age groups have estimated fluoride intake levels that are less than half the levels at which skeletal signs of fluoride exposure are first noticed. It is also important to recognize the possibility that the skeletal changes that may occur during a lifetime exposure to 200 µg/kg bw/day may actually be beneficial to people suffering from osteoporosis¹⁵ although more research into this possible benefit is needed.¹⁶ It is therefore premature to assign any kind of numerical

"margin of safety" to current levels of fluoride exposure.

Dental fluorosis, the first sign that there has been excessive prior exposure to fluoride is an extremely sensitive marker of fluoride exposure. It starts to become evident in people living in communities where there is only twice the recommended level of fluoride intake from fluoridated water (e.g. 2 ppm fluoride in the water). Today, there are many inappropriately used other sources of fluoride available which have resulted in an elevation of the daily intake of some Canadians to levels that are equivalent to 2 to 4 ppm in water. These, however, are levels of fluoride that are acceptable in terms of risk of skeletal fluorosis.^{12,17}

Until the true risks and benefits of increased fluoride intake with respect to skeletal fluorosis are better understood, recommendations to further reduce daily intakes, other than those related to inappropriate exposures to discretionary fluoride, should not be made. Otherwise, an increased incidence of dental caries will certainly result.

While the increased prevalence of dental fluorosis has alerted dental researchers to recommend decreases of inappropriate exposure to discretionary sources of fluoride in the general population,^{2,7,18} water fluoridation must continue to be supported by the community and by public health officials. It is still the safest, most equitable and cost effective means of controlling dental decay.^{6,19} ■

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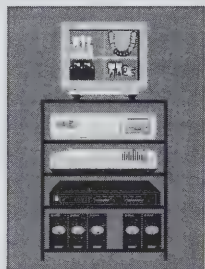


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HI-TECH HIGH CARE



The Creation and Integration of the High Tech Operator

Cheryl Farr

ABSTRACT

Dentistry is in the early stages of a major technological transformation. For the most part, however, computers and many of the other technological tools dentists use to gather or display clinical information, including intraoral cameras, digital radiography, and multimedia systems, have been less productive than they could be. This paper examines several offices where this technology is currently in use to provide working models of how integrated technology can be implemented into operatories to make them more flexible, productive, and resourceful environments for clinicians, and assist the clinician in creating a corresponding improvement in patient care.

Dr. Ken Neuman, a Vancouver dentist, actually talks to his intraoral camera. As he manipulates the camera during a patient examination, capturing images and storing them for later review, a head-mounted microphone picks up his voice. He uses the voice-annotation capabilities of modern technology to dictate clinical notes, which are permanently stored for review with the images.

Dr. Sanjay Rajpal's high-tech Red Deer, Alberta, operatories are fully equipped with computer monitors, but a casual observer

would not be able to find them at first glance. When a computer is required to view patient information or previously recorded images, the clinician uses a remote control system to open the cabinet tops, and smoothly lift both monitors and input/output devices to counter level. When the computer is no longer necessary, it is returned to the hidden and protected position.

The treatment rooms in Dr. George Freedman's Markham, Ontario, practice rank among the most technologically advanced dental operatories in North America. They contain not only integrated information technology, including digital radiography, intraoral imaging systems, and clinical charting software, but also advanced clinical technology such as dental lasers — in multiple wavelengths and delivery systems — micro plasma, and air abrasion.

None of this equipment is readily visible to the patient entering the operatory, even though all traditional fixed cabinetry, cuspidors, and counter-tops have been eliminated from Dr. Freedman's operatories. When the patient walks in, he or she sees only windows and walls.

A rapid proliferation of new materials and devices is opening the door to the sophisticated integration of high technology into operative dentistry, which in turn is being

progressively changed to take advantage of the new technologies. While the majority of dental practices still use computers to facilitate office billing procedures and other clerical tasks,¹ a growing minority of practitioners are using today's potent clinical technology to undertake dentistry's main task, namely diagnosis and treatment.

Computers have been used in dentistry for several decades, but the clinical use of computerized devices has been delayed and compromised by the high cost of electronic storage media, the primitive input/output devices and user interfaces available,² and the limitations of computer architecture. Today, however, the development of GUI (graphical user interfaces), multiple means of input (light-pen, touch-screen and voice), and 32-bit internal and external architecture for PCs has eliminated many of these obstacles.

While the earliest PCs limped along with eight-bit architecture and just 2⁸ memory addressing locations, today's 32-bit clinical workstations offer 2³² memory addressing locations, allowing a complexity in programming and functionality that makes the handling of all clinical dental information feasible.

Dentists who are not familiar with the exponential growth that has occurred in computer chip design over the last five years sometimes find

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the explosion of computer power hard to comprehend. Today's clinical information systems run on hardware that is thousands of times more powerful than the hardware we had only a decade or so ago. In fact, the capabilities of the average dental clinical workstation in 1996 far exceed the computer power available to U.S. astronaut Neil Armstrong in the lunar lander.

Storage problems persist, however. The handling and display of a digital radiograph consumes approximately 35 kilobytes, while an intraoral image can consume up to 600 kilobytes. Practices that keep all clinical information digitally stored can consume a gigabyte of magnetic storage in less than six months.

Some clinicians have achieved a partial solution to the storage problem by compressing images (which can reduce image quality), or by keeping historical image data either on-line or off-line in slower optical storage medium. Magnetic storage is still the medium of choice, however, because it offers rapid access and data transfer rates. In addition, the standard growth curve for the magnetic storage industry is 55 per cent per year. (Each year, the amount of magnetic storage that can be bought for the same amount of

money increases 55 per cent, allowing practitioners to purchase additional storage on an as-needed basis, while keeping their costs for electronic storage under control.)

A number of unresolved legal issues related to digitized images have slowed down the use of clinical information technology in dentistry.³ But despite the lag in legal protocols, some dentists are close to full implementation of the so-called "paperless practice." In Dr. Sanjay Rajpal's office, for example, all clinical information and images are stored only in digital fashion, with the exception of radiographs.

"We have an RVG (radiovisiography) unit," he said. "But it's not sufficient to meet the needs of the four dentists. So we also use conventional film radiography with a specially-adapted camera system to capture and store radiographic images digitally. We have no patient charts. The only thing we store in 'paper' format are film radiographs."

In Canada, practices which collect clinical information digitally can reduce their liability exposure by maintaining paper charts as a storage back-up. However, digital storage of clinical information has a number of advantages over conventional paper storage, including

reduced space requirements in the practice, and easy access to all data from multiple terminals in multiple locations. Integrated systems also provide centralized data storage and, when proper protocols are used, can protect against data corruption and loss.

"Our digitized records are more secure than our paper records, which are vulnerable to a fire or other catastrophe occurring," said Dr. Rajpal. "Since the software has an indexing system, there is a method to help insure the reliability of data. Any change made in a clinical record will trigger an automatic entry in the index."

"My goal is to eventually eliminate all paper records, but we're not there yet," said Dr. Freedman.

This is not an unusual situation. Many practitioners who capture information digitally are still storing paper back-up copies.

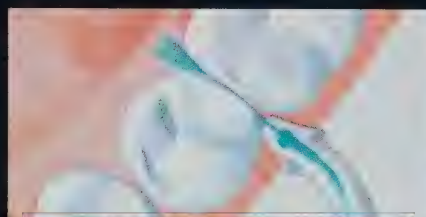
Once widely recognized legal standards are developed, dentists who use clinical information technology will have increased protection against record-related liabilities. The well-known rule of thumb, "anything not documented was not done," puts an onerous burden on practices that depend solely on manually-gathered records. Computerized systems allow more rapid documentation, and make it easier to maintain more organized and comprehensive patient records. In addition, the use of multimedia patient education programs, which are available on compact disc-interactive or computer platforms, can assist a clinician in pursuing a more aggressive and comprehensive strategy for patient education. This may help the clinician to prepare patients better and reduce litigation risks.

The dentists who are forging ahead in the use of integrated clinical information technology report three associated advantages:

- 1) enhanced patient communication,⁴
- 2) improved efficiency,⁵ and
- 3) better management of clinical information.⁶

Equipment such as intraoral cameras, charting programs, digital radiography and multimedia simula-

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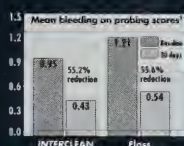


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tors make it easier for dentists to clearly inform patients about oral health concerns and the need for treatment.⁷ As is often said, seeing is believing. No matter how loquacious or skilled the presenter, verbal explanations cannot compete with the power and immediacy of a visual image of a tooth or X-ray that is magnified 20 or more times, and displayed on a video or digital monitor.⁸

Economic pressures and the need for increased efficiency are also escalating the spread of information technology. As the essential cost of labor rises in comparison the capital cost of new technology,⁹ some dentists are attempting to keep their fixed costs in line through automation.

Some dentists think of high technology mostly in terms of the initial cash outlay required. With the rapid decrease in the cost of computers and information technology, however, they may actually help practitioners to keep the cost of labor from economically marginalizing the practice. Some clinical technology is cost-effective overtime, either because it makes a procedure faster or easier, or because it coordinates work across the practice, bringing practical efficiency benefits such as

improved information flow between the front and back office, or the elimination of duplication in information entry. Integrated systems are particularly beneficial, because the most spectacular improvements in productivity and efficiency usually happen when the focus in an organization switches from improving the efficiency with which a specific task is performed to improving the effectiveness and performance of the group.

Clinical information systems are also increasing the use of visual images in the profession. Film is still the top choice of most clinicians for full-mouth radiographic series. However, when selective periapical radiographic analysis is done using an image capture device attached to a computer, radiographs are created within seconds. Multiple angulation views and retakes can be accomplished quickly and more efficiently, and no developing chemicals or film are required because charged phosphor screens do not require chemical processing.¹⁰

Recent developments in dental EDI (electronic data interchange) through CDAnet and the Canadian Dental Association's standardized treatment codes and claims forms have already moved Canadian den-

tistry to the forefront in the electronic transmission of claims information. Future developments in standards and technology will further expand the usefulness of EDI, making the instantaneous electronic transmission of clinical images and information to remote locations routine. This will be useful for continuous dental education and consultation, and allow for more efficient, effective, and coordinated whole-patient health care.

The third contribution made by clinical information technology is in the realm of improved case management. Most clinicians rely on human initiative and memory to augment the dental health information available in regard to the case at hand.¹¹ It is unrealistic to expect a clinician to retain or locate complete details of potentially hundreds of active cases, however, especially within the time constraints of an active practice. Automated storage and retrieval of all clinical information and images, which may eventually be linked to computer-assisted clinical processing and decision-support systems, can effectively improve clinical case management.¹²

Some dentists believe that clinical information technology provides improved diagnostic and treatment methodologies. Many of the dentists who use intraoral cameras in their practice claim that they benefit from improved diagnostics.¹³ Examining magnified images obtained with an intraoral camera during treatment can also lead to refinement in skills, through better visualization.

Three Models For the Integrated Operatory

Critical advancements in clinical technology have allowed clinicians to take advantage of what is now being called an "integrated" operatory. Integration allows computers, software and clinical peripheral equipment to communicate and share data, even if the various components of the system are made by different manufacturers, and applications run on different software.

Theoretically, with a completely integrated system, all clinically relevant data about the patient can be accessed and displayed through the "electronic patient record" stored on the computer. This information can include not only intraoral images, periodontal charts, text, and radiographic images, but also any other clinically relevant findings, including a three dimensional geometry of the oral cavity in digital form, computer models, image simulations of esthetic and anatomical outcomes, physical measurements, images of cast models, descriptive databases, video-captured patient encounters or operative procedures, or any other specific information or images about the patient's orofacial area or conditions that have been gathered. This information is synoptic, comprehensible and easily manageable, and is accessible from any terminal in the practice. The dentist and staff can enter, access, evaluate and process all information without worrying about what computing application it is coming from, or how the software is connected to the broader system. In addition, the information will generally be coupled with appropriate and specialized software, such as an orthodontic forecasting software that predicts the shape of a child's face in adulthood,¹⁴ or digital subtraction radiography to track bone loss in periodontal applications.

Researchers studying dentistry's clinical environment have found that if the energy and time required to yield a favorable return on a technological investment is too great, most dentists will simply not use the available information products.¹⁵ Integration virtually eliminates this problem. A truly integrated system allows clinicians to switch effortlessly from task to task, saving both time and effort.

Integration has become a high-tech buzzword. Many now accept the concept that integration is a "one size fits all" issue that will eventually lead to the creation of a "seamlessly integrated system," as opposed to today's "seemingly integrated systems." But completely

"seamless" integration is not necessary to make clinical information technology beneficial to practitioners. Useful levels of integration have already been achieved in a variety of different configurations, with different clinicians using different combinations of hardware, clinical peripherals, and software in their practice.

In general, today's integrated clinical systems can be divided into three classifications: the visionary model, the pragmatic model, and the scalable model. Dr. George Freedman's practice typifies the visionary integration model. It implements the most advanced forms of technology, and often radically departs from the traditional patterns found in service delivery. Visionary practices typically go "where no man has gone before," as can be shown in Dr. Freedman's elimination of all fixed storage in operatories, and a philosophy of appointing only two to five patients per day (excluding hygiene). But visionary integration requires the clinician to be comfortable with emerging technology, and to be willing to make the investment and take the necessary risks to make fundamental breakthroughs.

"When I developed my new practice, I started by forgetting all the requirements of the past," said Dr. Freedman. "The practice was built from the ground up based on needs, rather than presumptions or preconceptions. We evaluated every need and every function in a dental office first, in order to examine what the specific space and equipment requirements were. We ended up with a practice that was 180 degrees away from our office in the past."

In Dr. Freedman's office, operatory design and ergonomic considerations were modified to achieve advantages in asepsis, patient psychological comfort, and operatory esthetics. All equipment is brought into the operatory from a sterilization and supply area on specially constructed carts. Adequate "rolling room" has been provided to allow easy access for mobile radiovisiography, intraoral cameras, mi-

cro plasm, and laser units in and out of operatories. Computer records are stored in a compact laptop detachable terminal.

A second commonly-seen model can be termed pragmatic integration. In these practices, operatories are more representative of traditional operatory design, and the practice tends to follow more common patterns of service delivery. However, advanced clinical technology is implemented into the daily work of the practice.

In these practices, pragmatic considerations about space, cost and efficiency mandate the integration of some of the technology. The most "pragmatic" linkages include digitized intraoral cameras coupled with charting software and multimedia, with the possible addition of digital radiography, all on the same clinical workstation. Many different pragmatic integration configurations exist, all determined by the clinical circumstances and work habits of the practice.

A final model is scalable integration. Clinicians implementing scalable integration make sure that any clinical technology they buy is "scalable," so that it can be integrated into other forms of technology in the future as the practice advances and costs are reduced. Scalable integration can begin at any stage of dental practice. The graduating dental student, going into a start-up practice, who purchases a computer with an operating system that is appropriate for image management, and therefore on the pathway of "scalable" integration, provides a good example. When equipment is analyzed for integration capabilities, it becomes easier to add additional capabilities to the practice, and makes the gradual implementation of electronic patient records more feasible.

Scalable integration does not have to be limited to clinical computer systems. Many clinicians find it more useful to implement video clinical technology first. The scalable integrated system can be limited to a single intraoral camera on a cart, which can be integrated horizontally with other intraoral



equipment and monitors into a multi-operatory intraoral system. This scalable system can also be integrated vertically with other forms of video technology, such as compact-disc interactive. Eventually, the technology may be scaled up into a digital system or network, adding new capabilities for storage, voice input, or even speech recognition. The essential requirement is to purchase information technology that is fully scalable, and can be used in a multi-operatory format with other clinical technology, preferably in an open, networked system that can communicate and share information.

Looking into the 21st century, it seems likely that many new models for integration will be developed. Some of these will be simple and straightforward, while others may implement such futuristic elements as force-feedback mechanisms, eye-tracking technology and robotic systems with slaved operatory technology. Robotics is already used in a limited fashion in dentistry, primarily in CAD/CAM units. But robotics in the surgical environment of the future may be slaved not to a computer, but to a human operator, allowing operative procedures to be performed by remote means.

Surgical facilities testing the feasibility of remote site operative procedures are already being used in medical specialties such as ophthalmology. If dentistry follows a similar pattern, in the 21st century the integrated high-tech practice will be less constrained by the boundaries of operatory walls. It will become as much a "system" as a place. ■

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The Fine Art of Living with MS.

Kathy Harvey was diagnosed with multiple sclerosis at age 25. Later she became so disabled she was forced to leave her home and family to live in a Mississauga, Ontario, hospital.

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Interobserver Variability In Radiographic Interpretation Of Pediatric Dental Diseases: A Pilot Study

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ABSTRACT

Interobserver variability in radiographic interpretation of dental disease may be a result of clinical bias, education, training, experience or other factors, and may potentially lead to misdiagnosis of disease. Few studies have investigated variability related to dental specialty. The purpose of this pilot study was to determine interobserver variability in radiographic interpretation of pediatric dental diseases using a small number of observers, consisting of a pedodontist, an orthodontist and an oral radiologist. These specialists interpreted initial radiographic surveys of 200 pediatric patients (4.5 to 15.5 years old). The results showed no differences in interpretations of radiographic signs of dental abnormalities except for caries, abnormal primary root resorption due to the eruptive path of a permanent tooth and presence of a congenital/developmental tooth abnormality. These findings will be used to design future studies which will include a larger number of observers from different dental specialties.

SOMMAIRE

Dans l'interprétation radiographique des maladies dentaires, la variabilité entre les observateurs peut dépendre des orientations, de l'enseignement, de la formation, de l'expérience et d'autres facteurs cliniques et elle peut entraîner un diagnostic erroné de la maladie. Peu d'études ont porté sur la variabilité liée aux spécialités dentaires. Aussi cette étude-ci avait-elle pour but de déterminer la variabilité entre les observateurs dans l'interprétation radiographique des maladies dentaires pédiatriques en faisant appel à un petit nombre d'observateurs comprenant un pédodontiste, un orthodontiste et un radiologue buccal. Ces spécialistes ont interprété les premiers examens radiographiques de 200 patients pédiatriques (âgés de 4,5 à 15,5 ans). Les résultats ont démontré qu'il n'y avait aucune différence dans l'interprétation des données radiographiques des anomalies dentaires, sauf pour les caries, pour la résorption anormale d'une racine temporaire due au trajet d'éruption d'une dent permanente et

pour la présence d'une anomalie dentaire congénitale ou du développement. Les résultats de ces découvertes serviront à planifier les prochaines études comprenant un plus grand nombre d'observateurs de différentes spécialités dentaires.

Introduction

Radiography is an important adjunct to the clinical examination of dental disease since its purpose is to detect caries and other abnormalities which are not clinically apparent. However, considerable inter- and intra-observer variability in radiographic interpretation has been documented, particularly with respect to caries diagnosis.¹⁻⁴ Variability has been attributed to bias resulting from prior knowledge of clinical information,^{2,5} variation in film density,^{2,6} and observer education, training and experience.^{2,7-9} Interobserver variability is also increased when radiographic findings are equivocal, resulting in an increased rate of false negative and false positive diagnoses¹⁰ and is also influenced by the selection of observers.

Rohlin et al¹¹ studied observer performance in assessment of periapical pathology in panoramic and periapical radiographs using five endodontists, five general practitioners and five oral radiologists. The interobserver variability within each specialty group was similar for all three specialties but there were some differences between specialties. The diagnostic skill of oral radiologists was better than endodontists for periapical radiography but no differences in diagnostic accuracy between the three groups of observers were found for panoramic radiography. Variability will ultimately affect treatment planning and could subject young patients to over- or under-treatment, with possible long-term consequences.

Variability in radiographic interpretation of dental diseases other than caries or infection, and as a function of specialty training has not been explored extensively. It is possible that different areas of specialty training and clinical expertise may bias observers in radiographic interpretation. Information regarding such variability may indicate which common dental abnormalities are likely to be undetected or misdiagnosed. Interpretive guidelines can then be developed for disease entities where significant interobserver variability occurs and standardization in defining an abnormality as present or not present can be done.

Examination of variability between observers of different dental specialties may give an increased understanding of inherent bias within and between disciplines and aid in future construction of objective criteria for radiographic interpretation of dental anomalies. The purpose of this pilot study was to determine interobserver variability in radiographic interpretation of pediatric dental diseases using a small number of observers consisting of a pedodontist, orthodontist and oral radiologist. Preliminary information derived from this study can be used to direct future, broader studies examining interobserver variability in radiographic interpretation.

Methods and Materials

Initial radiographic surveys of consecutive pediatric patients

aged five to 16 years presenting for dental treatment at the faculty of dentistry, University of Alberta were interpreted by a pedodontist, orthodontist and oral radiologist. A consent for radiographs was signed by the parent/guardian of every patient, and at least one panoramic and two bitewing radiographs were available for each patient. All intraoral radiographs were exposed by dental students, whereas most panoramic radiographs were exposed by a radiology technician. If additional radiographs were available they were included in the study material. Intraoral radiographs were exposed using GE-1000 intraoral X-ray units (General Electric Co., Milwaukee, Wis.) operated at 80 kV and 15 mA, Kodak DF-58 film (Eastman Kodak Co., Rochester, N.Y.), and processed using a Dents 810 Basic automatic dental film processor (AFP Imaging Co., Elmsford, N.Y.). Periapical radiographs were taken with Rinn XCP instruments (Rinn Corporation, Elgin, Ill.) using the long cone paralleling technique, whereas bitewing radiographs were exposed without the use of position-indicating devices. Panoramic radiographs were exposed using a Siemens Orthophos panoramic unit (Siemens Aktiengesellschaft, Munich, Germany), Fuji RXO-G film (Fuji Photo Film Co. Ltd., Japan) with Lanex regular screens (Eastman Kodak Co., Rochester, N.Y.) and processed using a Kodak X-OMAT M20 automatic film processor (Eastman Kodak Co., Rochester, N.Y.). All processing was done under standardized conditions after daily densitometry and sensitometry measurements were taken to verify consistent processing conditions.

Radiographs were removed from patient charts and placed in an envelope so that observers had no knowledge of clinical findings, although patient sex and age were given. Radiographs were interpreted using a standard viewbox in a darkened room. Calibration of observers was not done except for an explanation of how to record data, since one aim of this study was to investigate variability due to possible bias related to clinical specialty. A standardized form was used for recording radiographic

findings in a "yes/no" (presence/absence of a finding) format for each case. The study material consisted of 200 panoramic, 441 bitewing, 46 periapical, and seven occlusal radiographs.

All data were coded and edited. The information was verified in a random sample of 10 per cent of the cases. Comparisons between specialists on the percentage of abnormalities in the sample were done by Cochran's Q test. A conservative significance level of $p < 0.001$ was selected to account for the multiple tests of comparison.

Results

The radiographs of 200 pediatric patients (97 females, 103 males) whose ages ranged from 4.5 to 15.5 years (mean = 9.95 ± 2.9) were used in this study. Frequency of radiographic abnormalities by specialist is presented in **Table I**. Caries was the most frequent radiographic finding, followed by periapical infection and abnormal primary root resorption due to the eruptive path of a permanent tooth. There were no cases showing evidence of periodontal bone loss, and maxillary sinus abnormalities, internal resorption and ankylosis were seen infrequently. The oral radiologist described 304 abnormalities whereas the pedodontist and orthodontist described 193 and 222 abnormalities respectively. For most disease categories, the oral radiologist reported more positive findings than the other specialists, and significant differences ($p < 0.001$) from both the pedodontist and orthodontist were found in reporting caries (61.5 per cent vs 47.5 per cent and 45.0 per cent), and abnormal primary root resorption due to the eruptive path of a permanent tooth (17.0 per cent vs 6.0 per cent and 4.5 per cent). The oral radiologist (12.0 per cent) showed a significant difference ($p < 0.001$) from the pedodontist (0.5 per cent) in reporting the presence of congenital/developmental tooth abnormalities. Ankylosis (5 per cent) was only reported by the pedodontist.

Agreement on the occurrence of abnormal radiographic findings by each pair of specialists and by all three specialists is provided in **Table II**. Total agreement was low-

Table I

Disease Frequency as Reported by Each Specialist

Radiographic finding	Per cent of cases exhibiting abnormalities as reported by each specialist*		
	Pedodontist	Orthodontist	Oral radiologist
caries	47.5	45.0	61.5 ^a
periapical/bifurcation infection	13.5	17.0	11.5
1° root resorption due to eruptive path of perm. tooth	6.0	4.5	17.0 ^a
ectopic eruption	5.0	4.5	10.5
premature tooth/space loss	5.5	5.5	10.0
congenital/developmental tooth abnormality	0.5	7.5	12.0 ^b
congenitally missing tooth	6.0	9.0	8.5
external root resorption	3.5	4.5	6.0
coronal/root fracture	0.0	4.5	5.0
bone abnormality	0.5	5.0	4.0
supernumerary tooth	2.0	1.5	3.0
maxillary sinus abnormality	1.0	2.5	1.5
internal resorption	1.0	0.0	1.5
ankylosis	5.0	0.0	0.0
periodontal bone loss	0.0	0.0	0.0

*percentages based on n=200

^aOral radiologist different from both orthodontist and pedodontist ($p < 0.001$).

^bOral radiologist different from pedodontist ($p < 0.001$).

est for caries (74.5 per cent), whereas ankylosis, supernumerary tooth, periodontal bone loss and internal resorption each showed agreement of 95 per cent or greater. Agreement on a pairwise basis was greatest for the orthodontist and pedodontist and least for the oral radiologist and pedodontist. On a pairwise basis (when all three specialists did not agree) there was more likely to be agreement on caries and abnormal root resorption by the orthodontist and pedodontist, while there was the least pairwise agreement by the orthodontist and pedodontist for periapical/bifurcation infection, oral radiologist and orthodontist for abnormal primary root resorption and premature tooth/space loss, and oral radiologist and pedodontist for ectopic eruption and congenital/developmental tooth abnormality.

Agreement by specialist pair and overall agreement for the presence of disease is provided in **Table III**. Agreement on the presence of caries, as expected, was

much higher (40 per cent) than for other radiographic abnormalities (1 per cent or lower for all findings except periapical/bifurcation infection (8 per cent) and congenitally missing tooth (4.5 per cent)).

Table IV provides information on agreement by specialist pair and overall agreement for the absence of disease. Agreement was lowest for caries and much higher for all other radiographic findings.

Discussion

Interobserver variability in radiographic interpretation can affect treatment planning, potentially resulting in over- or under-treatment, although clinical information must always be considered together with the radiographic findings. The initial radiographic surveys of 200 children presenting for treatment to a university dental clinic were interpreted by a pedodontist, an orthodontist and an oral radiologist, in order to determine interobserver variability in radiographic interpretation between

a limited number of specialists. This information can be used to direct future studies using a larger number of observers in each specialty.

The oral radiologist described more abnormalities than the other observers and was significantly different from them with respect to reporting caries, abnormal primary root resorption due to the eruptive path of a permanent tooth and presence of a congenital/developmental tooth abnormality. This is consistent with Hintze et al⁸ who found that oral radiologists, on average, reported a larger number of findings than orthodontists, likely because the radiologists reported on all deviations from normality whereas orthodontists may only have recorded anomalies which were not apparent in the clinical examination. Our findings of stronger pairwise agreement between the orthodontist and pedodontist in this study suggest that these specialists, to a similar extent, rely on clinical information to supplement radiographic findings.

Table II

Interobserver Agreement by Specialist on Abnormal Radiographic Findings

Radiographic finding	Agreement (per cent of cases)*			
	Radiol. and ortho. agree	Radiol. and pedo. agree	Ortho. and pedo. agree	All agree
caries	5.5	7.0	13.0	74.5
periapical/bifurcation infection	5.5	7.5	1.0	86.0
1° root resorption due to eruptive path of perm. tooth	2.5	6.5	9.0	82.0
ectopic eruption	6.5	1.0	6.5	86.0
premature tooth/space loss	2.0	8.5	5.0	84.5
congenital/developmental tooth abnormality	6.0	1.5	7.0	85.5
congenitally missing tooth	5.0	0.5	1.0	93.5
external root resorption	3.0	3.5	3.0	90.5
coronal/root fracture	3.5	1.5	1.0	94.0
bone abnormality	2.5	2.5	2.5	92.5
supernumerary tooth	0.5	0.5	2.0	97.0
maxillary sinus abnormality	1.5	1.5	3.5	93.5
internal resorption	1.0	0.5	1.0	97.5
ankylosis	5.0	0.0	0.0	95.0
periodontal bone loss	0.0	0.0	0.0	100.0

*percentages based on $n=200$

Of the radiographic abnormalities recorded, caries were most prevalent and also resulted in the lowest interobserver agreement. This may be related to the fact that the pedodontist and orthodontist also rely on clinical information in caries assessment while the radiologist is accustomed to using radiographs alone for reporting caries. Under these circumstances, it is not unusual that the radiologist reported a higher incidence of radiographic signs of caries.

Interobserver agreement in caries detection in adults has been investigated by others and varied between 70.4 per cent to 93.2 per cent in one study.² Our magnitude of interobserver agreement in caries diagnosis (74.5 per cent) is consistent with other studies.^{1,2,10,12-15} Incipient carious lesions present only in enamel may have contributed to interobserver variability. Gröndahl¹⁰ suggested that observers use strict criteria in caries reporting and should not report lesions when in doubt, regardless of

whether a positive finding is present. Caries were much more prevalent than other abnormalities in this sample. For this reason, there is a greater probability of variation in interobserver agreement for caries than for other less common abnormalities.

Periapical/bifurcation infection involvement was the second most frequent radiographic finding but did not result in significant interobserver variability, with all three observers agreeing 86 per cent of the time. The oral radiologist reported fewer periapical/bifurcation lesions, but this was not significantly different from the other specialists. The variability may have occurred because the radiologist decided that some periapical radiolucencies represented the dental papilla at the immature root apex rather than periapical lesions, although this cannot be confirmed from our data since no information on tooth vitality was available. It is also possible that both the pedodontist and ortho-

dontist detected more radiographic evidence of primary molar bifurcation involvement as a result of their clinical experience with primary molars. Our percentage of agreement is higher than in previous reports^{3-5,11} where interobserver agreement in reporting periapical lesions was often less than 50 per cent. It is not clear why our interobserver agreement was higher, but it may have been related to lesion size, lack of variation in film density, or to other unknown factors. Interobserver agreement was higher in determining that periapical lesions were absent, rather than present. Gelfand et al³ studied interobserver agreement in identification of periapical lesions and concluded that radiographic interpretation was not reliable in determining success rates in endodontics. The fact that our study involved younger patients than previous studies could have influenced our results and it is not clear if these pilot study results would be repeated if we used a larger number of observers.



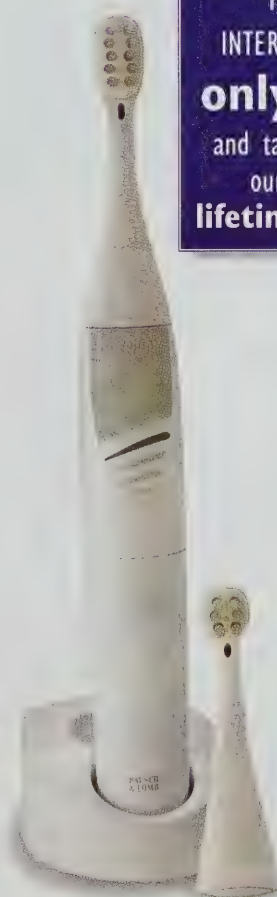
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Table III

Interobserver Agreement on Disease Presence

Radiographic finding	Agreement (per cent of cases)*			
	Radiol. and ortho. agree	Radiol. and pedo. agree	Ortho. and pedo. agree	All agree
caries	3.5	5.0	0.5	40.0
periapical/bifurcation infection	2.0	1.5	1.0	8.0
1° root resorption due to eruptive path of perm. tooth	2.0	5.0	0.0	1.0
ectopic eruption	2.5	0.5	0.0	1.0
premature tooth/space loss	0.5	4.0	0.0	0.5
congenital/developmental tooth abnormality	5.5	0.0	0.5	0.0
congenitally missing tooth	3.5	0.0	0.5	4.5
external root resorption	1.0	1.0	0.0	1.0
coronal/root fracture	2.5	0.5	0.0	1.0
bone abnormality	2.0	0.0	0.5	0.0
supernumerary tooth	0.0	0.0	0.0	1.0
maxillary sinus abnormality	1.0	0.0	0.0	0.0
internal resorption	0.0	0.5	0.0	0.0
ankylosis	0.0	0.0	0.0	0.0
periodontal bone loss	0.0	0.0	0.0	0.0

*percentages based on $n = 200$

The radiologist reported a significantly higher percentage of abnormal primary root resorption due to the eruptive path of a permanent tooth than the other specialists. This variability may be due to the clinical experience of the orthodontist and pedodontist using different criteria for determining an abnormality. The pedodontist and orthodontist may have decided that some cases represented normal variants and were not clinically significant, whereas the radiologist reported a larger percentage of such cases as abnormal.

The oral radiologist recorded a significantly higher percentage of congenital/developmental tooth abnormalities than the other specialists, including coronal abnormalities such as dens invaginatus and malformed crowns as well as root abnormalities such as dilacerations. There were no instances where all three specialists agreed on the presence of congenital/developmental tooth abnormalities, indicating that these are sub-

ject to considerable variation in interpretation. Lervik and Cowley⁹ examined variation in reporting dens invaginatus and found less variation in obvious rather than borderline cases. Our results may have been similarly affected, particularly if observers used different criteria for reporting root dilacerations as abnormal.

The pedodontist reported nine cases with at least one ankylosed tooth compared to no cases reported by the orthodontist and radiologist. Although it is not statistically significant, this difference suggests that different reporting criteria, including slight or marked tooth submersion as evidence of ankylosis, were used by the pedodontist. The radiologist and orthodontist both reported a higher percentage of bone abnormalities than the pedodontist. It is likely that the radiologist and orthodontist included suspected bone abnormalities in their assessments whereas the pedodontist only reported obvious abnormalities. Such report-

ing variability will have to be investigated further using more observers since such variability affects treatment planning and suggests a possibility that central bone lesions are misdiagnosed. No significant differences were found in interobserver agreement for any remaining radiographic findings, suggesting that despite the lack of observer calibration, reporting patterns for disease presence were similar. The higher interobserver agreement may also have been related to the low incidence of these other abnormalities.

Interobserver variability can affect the patient treatment plan, possibly resulting in over- or under-treatment. It was not our purpose to ask the observers to devise a treatment plan since only radiographic information was available. There was much higher agreement on the absence rather than the presence of disease for all abnormalities except for caries. This was most likely related to overall disease incidence since

Table IV

Interobserver Agreement on Disease Absence

Radiographic finding	Agreement (per cent of cases)*			
	Radiol. and ortho. agree	Radiol. and pedo. agree	Ortho. and pedo. agree	All agree
caries	2.0	1.5	13.0	34.5
periapical/bifurcation infection	3.5	6.0	0.0	78.0
1° root resorption due to eruptive path of perm. tooth	0.5	1.5	9.0	81.0
ectopic eruption	4.0	0.5	6.5	85.0
premature tooth/space loss	1.5	4.5	5.0	84.0
congenital/developmental tooth abnormality	0.5	1.5	6.5	85.5
congenitally missing tooth	1.5	0.5	0.5	89.0
external root resorption	2.0	2.5	3.0	89.5
coronal/root fracture	1.0	1.0	1.0	93.0
bone abnormality	0.5	2.5	2.0	92.5
supernumerary tooth	0.5	0.5	2.0	96.0
maxillary sinus abnormality	0.5	1.5	3.5	93.5
internal resorption	1.0	0.0	1.0	97.5
ankylosis	5.0	0.0	0.0	95.0
periodontal bone loss	0.0	0.0	0.0	100.0

*percentages based on $n = 200$

other radiographic abnormalities were much less common than caries. Pronounced agreement on absence of disease implies that no treatment will be performed since no disease is deemed present. There was less overall agreement on whether caries were absent. In this situation, it is necessary to consider that either radiographic evidence of disease which was actually present was undiagnosed (and will therefore not be treated) or the disease was over-diagnosed (disease was actually absent but diagnosed as present) resulting in the potential for over-treatment.

Our study was limited in that our sample was not random. It was only comprised of patients seeking dental treatment at the university and only one member of each of three dental specialties served as observers. However, our results are useful in determining which types of dental diseases may be more prone to interobserver variation in radiographic interpretation and this information will

help direct future, more extensive studies. Calibration of observers, with the exception of an explanation on how to record data, was not done due to the express purpose of recording the usual radiographic interpretive practices of the three observers. A simple method of decision-making (yes/no, present/absent) was used because it reflects clinical situations where treatment decisions are based on diagnostic information. Because clinical information was not made available to observers, they were forced to decide on the presence or absence of disease based on the radiographs alone. There have been reports of film density affecting the rate of true positive and false positive caries diagnoses.^{2,16} Our results were probably not affected by variations in film density and processing since a regular quality assurance program was carried out on all radiology equipment. Radiographs were approved as being diagnostic and free of gross density errors by

clinical instructors who were not involved in the study.

Because of the small number of observers used in this study, it is not possible to extrapolate our results to encompass a larger number of dental specialists. However, the results of this study are useful in highlighting areas of increased interobserver variability which can be studied further in future studies.

Conclusions

1. Interobserver variability in radiographic interpretation of pediatric dental diseases by a pedodontist, an orthodontist and an oral radiologist was examined in this pilot study. The oral radiologist described more positive findings than the other specialists and differed from the others in reporting presence of caries, abnormal primary root resorption due to the eruptive path of a permanent tooth and presence of congenital/developmental tooth abnormalities.
2. The low incidence of some

radiographic abnormalities may have masked potential interobserver variability.

3. Some of the differences between specialists may have been related to reliance on clinical findings to supplement radiographic findings by the pedodontist and orthodontist although other biases could not be ruled out. A team approach to radiographic diagnosis is ideal but likely impractical in most clinical settings.

4. This pilot study should be expanded to include a larger number of observers from different dental specialties as the results of such studies may be helpful in developing guidelines with respect to radiographic interpretation to reduce interobserver variability.

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RADIOLOGY



The Use Of Dental Radiographs To Estimate the Probability Of Cavitation Of Carious Interproximal Lesions Part I: Evidence From The Literature

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ABSTRACT

It is generally recommended that a cavitated, carious lesion be present before an interproximal tooth surface is restored. These lesions often are not clinically visible, however, and must be diagnosed using dental radiographs. Radiographic results can underestimate and overestimate the size of a carious lesion. The purpose of this study was to review and graphically summarize studies that have investigated the relationship between the radiographic image and the presence of a cavitated lesion on the interproximal surfaces of permanent teeth.

A search of the literature identified 13 studies, eight of which were suitable for inclusion in our summary. Using the positive and negative likelihood ratios from each study, a graphical summary was developed showing the probability of cavitation based on the radiographic test result and the dentist's pre-radiograph estimate of the probability of cavitation. This graph should allow dentists to

more accurately inform their patients of the probability of a cavitated interproximal lesion being present or absent. As a further observation, our findings suggest that to avoid frequent false positive diagnoses, dentists should estimate the probability of cavitation to be at least 30 per cent before they prescribe radiographs for patients who visit them on a regular basis.

SOMMAIRE

Bien qu'il soit généralement recommandé d'attendre qu'une lésion cariée avec cavitation soit présente avant de restaurer une surface dentaire proximale, les lésions de ce genre ne sont pas souvent cliniquement visibles et doivent être diagnostiquées à l'aide de radiographies dentaires. Or les données radiographiques peuvent surestimer ou sous-estimer l'étendue d'une lésion cariée. Cette étude a pour but de réviser et de résumer sous forme graphique les études portant sur les liens existant entre l'image radiographique et la

présence d'une lésion avec cavitation aux surfaces proximales des dents permanentes.

Une recherche bibliographique a révélé 13 études, dont huit étaient convenables pour le présent résumé. En utilisant les taux de probabilité positifs et négatifs de chaque étude, on a préparé un résumé graphique montrant la probabilité de cavitation à partir de données radiographiques et de l'estimation de cette probabilité par le dentiste avant la prise de radiographies. Ce graphique devrait permettre aux dentistes de renseigner leurs patients avec plus de précision touchant la probabilité qu'une lésion proximale avec cavitation soit présente ou absente. Comme autre observation, les découvertes qu'on a faites laissent entendre que, pour éviter de faux diagnostics positifs fréquents, les dentistes devraient estimer la probabilité de cavitation à 30 pour cent avant de prescrire des radiographies aux patients qui les visitent régulièrement.

Introduction

Recommendations in the current dental literature indicate that a carious smooth surface lesion should not be restored until cavitation has occurred.^{1,2} However, interproximal surfaces often cannot be detected visually and if, after performing a clinical exam, a dentist suspects that a cavitated lesion may be present, he or she will often prescribe a bitewing radiograph. Dental radiographs are valuable tests for helping diagnose interproximal caries, but they can underestimate or overestimate the size of a carious lesion.^{3,4}

Recently, Matthews, Banting, and Bohay⁵ reviewed the scientific basis of diagnostic tests to aid clinical diagnoses and illustrated their use in testing for oral cancer with toluidine blue dye. The use of dental radiographs to test for interproximal caries is much more common. By employing the concepts discussed by Matthews et al,⁵ we feel that dentists can more easily apply scientific evidence when using dental radiographs in their daily practices.

To determine how well radiographs identify cavitated lesions, several investigators have compared radiographic findings to a second definitive test of a tooth's caries status (i.e. the gold standard). For example, the gold standard may be a histological examination of the tooth after it is extracted to identify the surfaces that truly are and truly are not cavitated.

The purpose of this paper is to review the studies that have investigated the relationship between the radiographic images of interproximal surfaces of permanent teeth and the presence or absence of cavitated lesions on these surfaces. The studies are summarized according to sensitivity, specificity, and likelihood ratios. The likelihood ratios are then used to portray graphically how radiographic results can be used to estimate the probability of finding a cavitated interproximal lesion when it is present, or not finding a cavitated interproximal lesion when it is absent. This graph can be used by dentists to accurately inform patients of the probability that a cavitated interproximal lesion is present or absent.

Methods

Computer-aided (Medline) and manual searches of the dental literature were carried out in 1992 to identify English language studies of humans that reported their radiographic findings for cavitated and non-cavitated interproximal tooth surfaces. Cavitation was defined as the stage in the decay process when the enamel has lost its surface integrity and a discontinuity into the enamel has developed. Three Medline searches were carried out using the following Medical Subject Headings: (1) dental caries diagnosis, (2) dental caries therapy, and (3) dental caries, which was combined with a text search of titles and abstracts for the word "treatment." Studies were examined to determine if they employed a gold standard that was independent of the radiographic findings. Such a method would involve some type of direct inspection of the tooth surface in question.

Results of the selected studies were summarized according to whether or not there was a radiolucency in the dentin, which we defined as our radiographic threshold for cavitation. At this threshold, a radiographic test result is considered to be positive (i.e. a cavity is present), if the radiolucency extends into the dentin. This threshold was chosen because it is the most commonly recommended radiographic depth at which a carious lesion should be restored.^{1,2}

Based on the accepted radiographic threshold for cavitation, the sensitivity, specificity, positive likelihood ratio, and negative likelihood ratio of the radiograph as a test for cavitation of carious interproximal lesions were calculated for each study. The positive and negative likelihood ratios were then used to calculate the post-test (post-radiograph) probability of cavitation following a positive and a negative test result according to the methods described by Matthews et al.⁵ For each of the eight studies, the post-test probability of cavitation following a positive test result (radiolucency in the dentin) was calculated for each 0.01 increase in the pre-test probability, beginning with a pre-test probability of 0.00 (0 per cent)

and finishing with a pre-test probability of 1.00 (100 per cent). Then, using the post-test probabilities calculated for each of the eight studies, the mean post-test probability and its 95 per cent confidence interval were calculated for the full range of pre-test probabilities, 0.00 through 1.00. This same procedure was then carried out based on a negative test result (radiolucency absent or in the enamel up to and including the DEJ). The pre- and mean post-test probabilities were then plotted against each other for both positive and negative radiographic test results.

Results

The literature search identified 13 studies (14 publications) that were written in English and which applied a gold standard that was independent of radiographic results.^{3,6-18} Five of these studies^{3,10,13-15,17} were excluded from further analyses because they did not include cases with a full range of conditions. For example, three of these studies^{3,10,13,14} established their gold standard, i.e. the presence or absence of a cavity, while restoring the tooth in question. Therefore, they would not have included teeth which the investigators believed were sound, biasing their results towards fewer false negative findings. Similarly, de Araujo et al¹⁷ included only teeth with a radiolucency and Kogon et al¹⁵ included only teeth with a radiolucency confined to the enamel.

The eight selected studies employed two types of gold standards. Most frequently, investigators established a gold standard by careful examination of extracted teeth. To establish the number of truly cavitated lesions, the extracted teeth were examined by the unaided eye,^{6,11,12} by magnified visual examination of the surfaces,¹⁶ or by visual plus histological examination of the teeth.^{8,9} Most of the teeth were from children or teenagers and were extracted for orthodontic reasons. Some teeth were also extracted due to caries or periodontal problems.

The second method of establishing the gold standard used direct examination of vital teeth.

Table 1

Selected Studies Investigating Radiographic Images of Cavitated Carious Lesions

Studies According to Their Method of Determining the Gold Standard	Number of Tooth Surfaces	Cavity Prevalence	Sn	Sp	+LR	-LR
Examined Extracted Teeth						
Waggoner & Ashton ¹⁶	158	0.26	0.37	0.93	5.35	0.68
Espelid & Tveit ¹²	151	0.66	0.43	0.95	8.69	0.60
Mejare et al ¹¹	598	0.05	0.21	1.00	**	0.79
Downer ⁹	185	0.36	0.73	0.97	21.57	0.28
Purdell-Lewis et al ⁸	100	0.39	0.28	0.98	17.21	0.73
Marthaler & Germann ⁶	395	0.21	0.33	0.98	20.30	0.69
Examined Teeth Through Interproximal Spaces						
Pitts & Rimmer ¹⁸	1,468	0.01	0.87	0.99	96.87	0.13
Rugg-Gunn ⁷	370	0.09	0.35	1.00	**	0.65

Sn = Sensitivity Sp = Specificity +LR = Positive Likelihood Ratio -LR = Negative Likelihood Ratio

** = undefined due to 0 false positives

Rugg-Gunn⁷ included only children and teenagers who had teeth with an existing interproximal space, so that the surfaces could be examined clinically. Pitts and Rimmer¹⁸ used elastic separators to create a temporary interproximal space between the teeth of children and teenagers and then clinically examined the surface in question.

When a radiolucency was present, the studies used a variety of methods to describe the radiographic depth of the lesion in the enamel and dentin. The most common method was to divide the enamel and dentin into halves, and include the DEJ as part of the inner half of the enamel.^{6,16,18} Other studies used similar divisions, but divided the enamel into an outer two-thirds and an inner one-third¹¹ or divided the dentin into thirds.¹² Rugg-Gunn⁷ identified radiolucencies as being in the enamel or at the DEJ, which we classified as enamel radiolucencies, or in the outer or inner dentin. However, in all of these studies the DEJ was included as part of the inner enamel. Based on our accepted radiographic threshold for cavitation, radiographic data from these studies were simplified and reclassified as either radiolucencies confined to the enamel, including the DEJ, or

radiolucencies in the dentin.

Two studies however, Downer⁹ and Purdell-Lewis et al,⁸ combined the results for radiolucencies extending to the DEJ with dentin radiolucencies rather than with enamel radiolucencies. Downer⁹ assigned his radiographic findings to one of two groups: (1) no radiolucency or in the enamel, which we classified as enamel radiolucencies, or (2) at the DEJ, in the outer dentin, or in the inner dentin, which we classified as dentin radiolucencies. Purdell-Lewis et al⁸ partitioned the tooth enamel into the outer two-thirds and the inner one-third of the enamel, which we classified as enamel radiolucencies, and divided the dentin into three sections, including the DEJ, which we classified as dentin radiolucencies. Including the DEJ with dentin radiolucencies was necessary in these two instances, but we do not feel that this will result in much error as the DEJ is simply the abutment of the enamel and the dentin. Therefore, lesions that extend precisely to the DEJ should be rare.

In general, the studies' designs were of moderate quality. All studies involving more than one examiner when visually or radiographically scoring the tooth surfaces addressed inter-examiner agreement, except for one study¹⁶

which did not identify who or how many individuals visually assessed the tooth surfaces. Similarly, with the exception of one study,⁸ all studies using only one examiner published some measure of intra-examiner agreement. However, none of the studies involving more than one examiner published any measures of intra-examiner agreement. Only three^{6,8,12} of the eight studies used blinded examiners, where the individuals scoring the radiographs were unaware of the clinical scores and vice versa.

The results of the eight studies are summarized in **Table 1**. Specificity values from all of the studies were greater than 0.90, and most of the studies also had negative likelihood ratios which were similar to each other. However, two studies^{9,18} had much lower negative likelihood ratios and much higher sensitivity values than the other six. Positive likelihood ratios and cavity prevalence varied substantially, and for two studies,^{7,11} the positive likelihood ratio could not be calculated because there were zero false positive findings.

Fig. 1 shows the relationship between the pre-test probability and the mean post-test probability of cavitation based on a positive radiographic finding (i.e. radiolucency extending into the dentin).

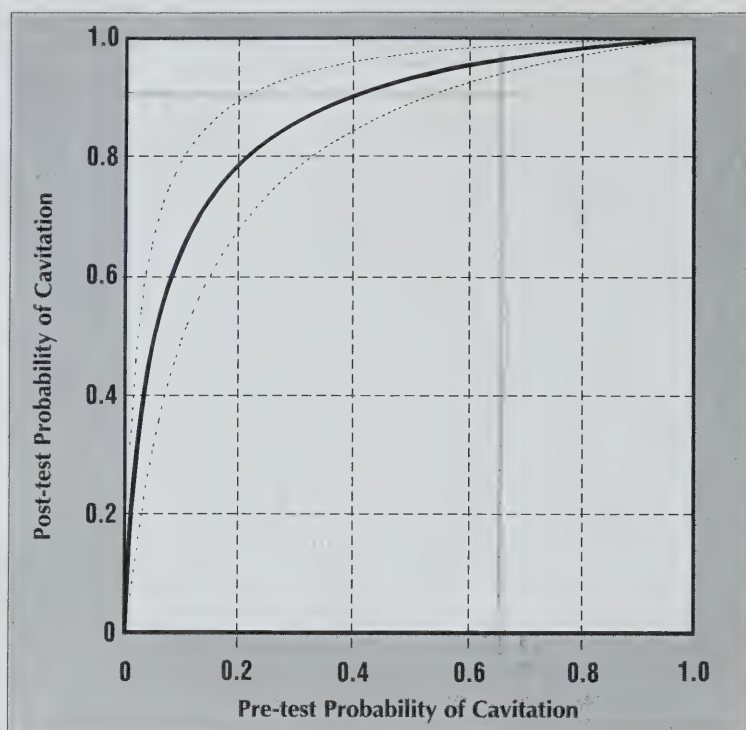


Fig. 1: Pre-test and mean post-test probability of cavitation (± 95 per cent confidence interval) based on a positive radiographic test result.

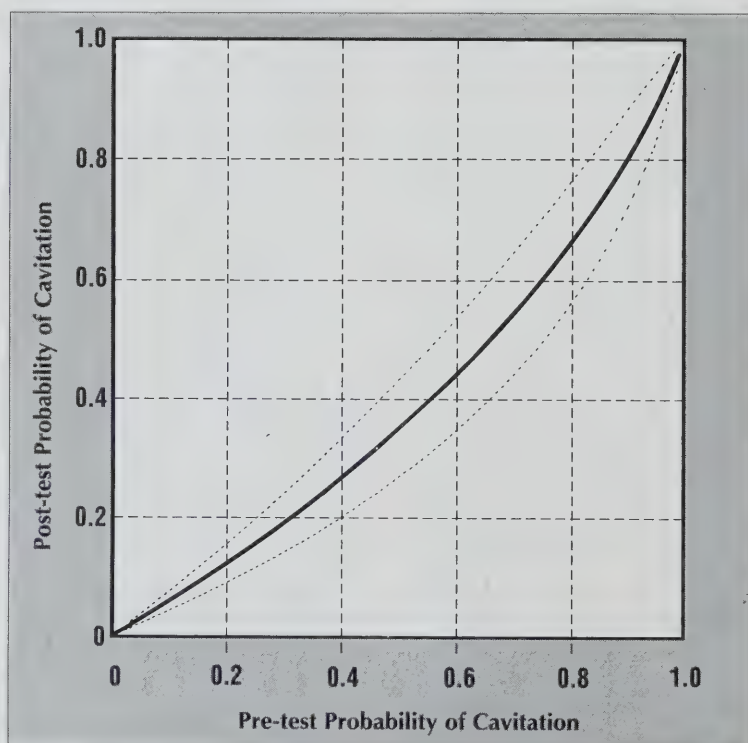


Fig. 2: Pre-test and mean post-test probability of cavitation (± 95 per cent confidence interval) based on a negative radiographic test result.

By drawing a vertical line up through the graph, starting on the x-axis at the dentist's estimate of the pre-test probability of cavi-

tion, the dentist can determine the post-test probability (solid line) along with its 95 per cent confidence interval (dotted lines). For

example, if a dentist's estimate of the pre-test probability of cavitation is 20 per cent and there is a radiolucency extending into the dentin, the post-test probability of a cavity being present is approximately 78 per cent with a 95 per cent confidence interval of 68 to 88 per cent (**Fig. 1**). Thus, the dentist can be 95 per cent certain that the probability of cavitation is between 68 per cent and 88 per cent. As the pre-test probability increases, the post-test probability also increases and the confidence interval becomes smaller, which means the dentist can be more certain.

Similarly, **Fig. 2** shows the pre-test and post-test relationship if the radiographic finding is negative. If the pre-test probability of cavitation is 20 per cent but there is no radiolucency, or the radiolucency is confined to the enamel, the probability of cavitation decreases to approximately 13 per cent with a 95 per cent confidence interval of approximately nine to 17 per cent.

Discussion

Current recommendations in the literature suggest that the average carious interproximal lesion in a permanent tooth should not be restored until the lesion is cavitated. If, based on the findings of a clinical examination, a radiograph is necessary because the tooth surface cannot be diagnosed visually, a radiolucency should extend into the dentin before restorative intervention is initiated.^{1,2} This restorative threshold is favoured over restoring lesions at an earlier stage, such as when the radiolucency is confined to the inner enamel, because it reduces the frequency of false positive diagnoses. Thus, the frequency of unnecessary restorations is also reduced. Following a negative test result, this threshold results in a slightly higher frequency of false negative diagnoses than an earlier threshold (i.e. radiolucency in the inner enamel), but this should be of little concern in patients who visit on a regular basis. Although there is a small probability that the lesion may progress to the pulp before the next dental visit, this is very rare; progression of the average carious approximal lesion in a permanent tooth is slow, requiring

three to four years on average to move through the enamel.^{19,20}

Our findings re-emphasize the importance of the pre-test probability in clinical decision-making. A dentist's estimate of the pre-test probability of cavitation will be based on the findings of a clinical examination and a number of other factors which may include the prevalence of cavitated lesions in the dentist's clientele and the patient's past caries experience. However, we feel that a radiograph should be prescribed only after the dentist considers the pre-test probability of cavitation in a permanent tooth of a regular visitor to be at least 30 per cent. At this level, **Fig. 1** shows that the dentist and patient can be more than 80 per cent certain that a cavity is present following a positive test result (i.e. radiolucency extending into the dentin), which will limit the frequency of false positive diagnoses. Following a negative test result, the practitioner can be more than 80 per cent certain that a cavity is not present (**Fig. 2**) and may consider monitoring the lesion and providing preventive intervention where appropriate. When the pre-test probability of cavitation in a regular visitor is below 30 per cent, the dentist may consider regular monitoring of the suspicious area with or without preventive intervention.

Based on the results, we also feel that when the pre-test probability of cavitation in a regular visitor is estimated to be very high, such as 90 per cent, a radiograph should not be prescribed for the purpose of caries diagnosis because the radiographic findings will be of limited value. If the test result is positive, the probability of cavitation can only increase a maximum of 10 per cent, and if the test result is negative, the post-test probability that a cavity is present will still be 80 per cent or more. Thus, the findings would be unlikely to change the patient's choice of treatment.

The findings summarized in **Fig. 1** suggest that radiographs should not be used to screen for interproximal caries in patients with no signs or symptoms of a carious lesion. If the prevalence of cavitated interproximal lesions in a hypothetical population was 10 per cent, then the pre-test prob-

ability of cavitation in an asymptomatic patient also would be 10 per cent. (Considering the present level of caries in industrialized countries, and the fact that most of these, in children at least, are pit and fissure lesions, a 10 per cent prevalence of cavitated interproximal lesions would be exceptionally high.) Following a positive radiographic test result, the post-test probability of cavitation would be approximately 65 per cent, with a 95 per cent confidence interval of approximately 50 to 80 per cent. In other words, if dentists restored all teeth with positive radiographic findings, on average, only 65 of every 100 cases would actually involve a cavitated lesion, with the remaining 35 being restored unnecessarily. If the prevalence of cavitated interproximal lesions in our hypothetical population falls below 10 per cent, then the number of false positives (and unnecessary restorations) would increase substantially. A recent study by Hintze²¹ also questions the appropriateness of using radiographs to screen for dental caries.

Our results are similar to other recently published studies which were not available at the time of our literature search.^{22,23} Using methods similar to those reported here, Peers et al²² plotted the prevalence of approximal dentin lesions against the positive and negative predictive values of a dental radiograph when the radiolucency extends to the DEJ or into the dentin. Their study found that when the prevalence was 10 per cent, the probability that a radiolucency truly represented a dentin lesion was less than 50 per cent. Interestingly, Verdonchot et al²⁴ carried out the same type of analysis for occlusal caries and found that the probability of dentin caries after discovery of a dentin radiolucency was only slightly greater than the prevalence. Thus, the radiograph appears to be of very limited value for diagnosing occlusal dentin lesions. Russell and Pitts²³ studied the sensitivity and specificity of dental radiographs for diagnosing approximal dentin caries when using D-speed and E-speed film and found the sensitivities of 0.29 and 0.30, respectively, and the specificities of 0.92 and 0.96, respectively. These values are similar to those

reported by the majority of the studies listed in **Table 1**.

Although sensitivity and specificity values for a diagnostic test are supposed to be stable, we found that the sensitivity values varied substantially among the studies. Problems associated with radiographic technique and interpretation may account for much of this variability. Benn and Watson⁴ have shown that slight differences in radiographic technique can result in significantly different radiographic findings. A number of studies have also shown that the radiographic findings and treatment plans of dentists can vary substantially after they have examined the same radiograph.²⁵⁻²⁷ Sources of variation in radiographic interpretation include examiner fatigue, examiners' prior expectations of decay,²⁸ and examiner information on the consequence of misdiagnosis.²⁹ These sources of variation reflect the variation that will occur among dentists in general practice.

Although studies have shown that the rate of dental decay may be slower in adults than in children,^{20,30} all of the studies included in **Table 1** involved the permanent teeth of children or teenagers. Therefore, we do not believe age to be an important source of variation.

We have developed graphs showing how the post-test probability of cavitation in permanent teeth can be determined by the pre-test probability of cavitation and the radiographic test result. Radiographic findings can underestimate or overestimate the extent of a carious lesion and do not guarantee the absolute presence or absence of a cavity.^{3,4} Radiographic findings need to be placed in the context of the pre-test probability of disease which is affected by clinical indicators, patient history, and disease prevalence. A positive or negative radiographic finding provides additional information that the clinician can use to determine the probability that a cavity is present or absent.

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RADIOLOGY



The Use Of Dental Radiographs To Estimate the Probability Of Cavitation Of Carious Interproximal Lesions Part II: Two Patient Scenarios

J.L. Leake, DDS, DDPH, M.Sc., FRCD(C)

G.L. Woodward, M.Sc.

ABSTRACT

Diagnosis of a cavitated interproximal lesion is often not confirmed until the tooth is treated. Before treatment, clinicians and patients are dealing with probabilities which can be estimated from clinical evidence, radiographic evidence, and information found in the dental literature. The probability of a diagnostic test result being correct is affected by the threshold of the test and the pre-test probability of the disease in question, which varies with the prevalence of the disease. We illustrate how clinicians can inform themselves and their patients of the probability of a radiographic lesion being truly cavitated based on graphs that summarize the currently available evidence. Dentists who use these graphs can more accurately inform their patients who can then choose the course of care that best meets their individual needs.

SOMMAIRE

Souvent, le diagnostic d'une lésion proximale avec cavitation

n'est pas confirmé jusqu'à ce qu'on traite la dent. Avant le traitement, cliniciens et patients ont affaire à des probabilités qui peuvent être estimées à partir d'indications cliniques, de données radiographiques et d'informations trouvées dans la littérature dentaire. La probabilité que les résultats d'un test diagnostique soient bons est modifiée par le seuil du test et par la probabilité de la maladie en cause avant le test, laquelle probabilité varie suivant la prévalence de celle-ci. Dans cet article, on montre comment les cliniciens peuvent se renseigner et renseigner leurs patients touchant la probabilité d'une lésion radiographique avec réelle cavitation à partir des données actuellement disponibles. Les dentistes qui utilisent ces graphiques peuvent renseigner leurs patients avec plus de précision et ceux-ci peuvent choisir le programme de soins qui répond le mieux à leurs besoins particuliers.

Introduction

Dr. Goodcare practises in a middle-class area of an urban fluoridated commu-

nity in southern Ontario. She tries to keep up with the literature, and knows from her reading that incipient, non-cavitated lesions, where the enamel surface is intact, can remineralize through the use of topical fluorides.¹⁻³ Therefore, these lesions should not be restored until the enamel surface breaks down (i.e. cavitation occurs).^{4,5}

Because clinically diagnosing a cavitated approximal lesion can be very difficult, Dr. Goodcare often uses radiographs to aid in the diagnosis of suspicious areas found during her clinical examination. However, based on her reading, as well as her own experience, Dr. Goodcare realizes that bitewing radiographs don't show the whole picture^{6,7} and that any restoration she places will eventually need replacing.⁸ She also realizes that the incidence of caries has declined dramatically over the 15 years since she graduated. This, combined with the home care that many of her patients practise, means that only a minority of the patients she examines have a new cavity, and, for the children in her practice, most are pit and fissure cavities.



The purpose of this paper is to show the practical problems in using diagnostic tests and, using two patient scenarios, to show how to use the graphical summary presented in Part I of this two-part series⁹ to improve the diagnosis of cavitated interproximal dental caries.

Scenario One

Among Dr. Goodcare's many long-time patients is Tom, a 25-year-old who has grown up in the community. Although he now works and lives in a British Columbia logging camp, Tom visits Dr. Goodcare when he is home visiting his parents. During Tom's examination, Dr. Goodcare has found a suspicious interproximal area which she can't probe easily, and based on the patient's caries history, her own experience, and the prevalence of cavitated carious lesions in the population she treats, she feels that there is a chance that a cavity is present. She estimates the probability of cavitation to be only about 30 per cent. To aid her diagnosis she orders a bitewing radiograph and finds a radiolucency extending two-thirds through the enamel on the mesial of 37. She informs Tom of the finding and he asks: "Do you think it's really a cavity? I haven't felt anything there." What does she tell him?

Scenario Two

Recently, a family with adolescent children have become Dr. Goodcare's patients. They have moved from a neighboring fluoridated community and copies of their records, which their previous dentist sent along, show them to be regular visitors. When examining Jennifer, a 14-year-old, Dr. Goodcare finds a suspicious interproximal area, but this time she feels more strongly that a cavity is present. Although Jennifer has reported no symptoms, Dr. Goodcare estimates that the probability of a cavity being present is 60 per cent. A radiograph of this area that was taken two years ago is a little fuzzy, so Dr. Goodcare orders a new bitewing radiograph. The new radiograph shows a radiolucency extending into the dentin on the distal of 15. When informed of the radiolucency, Jennifer says she "totally freaks out" if she has a needle and asks if

Dr. Goodcare is sure that this is really a cavity. What does Dr. Goodcare tell Jennifer?

Using the Evidence to Assist in Decision-Making

Scenarios one and two are appropriate for considering the information which Dr. Goodcare needs in order to inform herself, and her patients of the probability of these being truly cavitated lesions. In other words, she needs to know the precision of her diagnostic test (i.e. her radiographic findings).

Diagnostic tests are not perfectly precise and even the best tests sometimes give results that do not correspond to a final diagnosis as determined by a second definitive test or gold standard. Recent articles by Douglass¹⁰ and Bratthall¹¹ have pointed out that measures of test precision, known as sensitivity and specificity, are lacking for many of the new diagnostic tests in dentistry. They state that in order to decide on what test to use, practitioners need these, plus information on the long- and short-term variation in test results, and the incidence/prevalence of the disease or condition being assessed by the test.

In Part I of this two-part series,⁹ we developed a simple graphical method to aid in the diagnosis of cavitated, carious, interproximal lesions using dental radiographs. This method will allow dentists to inform themselves and their patients of the probability that a cavity is truly present or absent based on the depth of the radiolucency.

Before prescribing radiographs, Dr. Goodcare felt that the pre-test probability of Tom having a cavity was 30 per cent and 60 per cent for Jennifer. These estimates are based primarily on Dr. Goodcare's experience with the clients she treats, the clinical appearance of the teeth, the caries histories of the two patients, and the prevalence of new cavities in similar patients in her practice. Dr. Goodcare has taken radiographs to help her decide if these suspicious interproximal areas are cavitated and should be restored.

The question remains, how does Dr. Goodcare interpret her radiographic findings for two patients, Tom and Jennifer. To an-

swer her question, Dr. Goodcare refers to the article published as Part I of this series,⁹ and, using **Figs. 1** and **2** from this article, estimates the post-test probability of cavitation based on her pre-test estimates.

Dr. Goodcare explains to Tom that before she took the radiograph she felt that there was a 30 per cent probability that a cavity was present. The radiograph shows a radiolucency that has not reached the dentin, and is still confined to the inner enamel. She explains that by adopting her usual conservative approach to restorative dentistry, she would define this as a negative test result. Thus, by consulting **Fig. 2** and drawing a vertical line from 0.30 (30 per cent) on the X-axis (pre-test probability) to the point where it intersects the curve and then moving horizontally to the Y-axis, they can see that the probability of a cavity being present has decreased to 20 per cent.

Tom's disease history is typical of her patients and Dr. Goodcare knows that the average carious approximal lesion progresses slowly, requiring three to four years to advance through the enamel to the dentin. At this point Dr. Goodcare explains to Tom that she usually would not recommend a restoration, opting instead for preventive intervention using remineralizing techniques such as topical fluoride. However, she is worried about the fact that he only comes home every year or so, and she might not see him for 18 months. She advises him that he probably has several months before any such lesion, if it were present, might progress through to the dentin and cause pain. She then presents him with his options: (a) do nothing and re-examine at his next trip home; (b) treat it now with remineralizing solutions and improved attention to home care and re-examine at his next trip home; or, (c) restore it.

Accurately informed, Tom can make his choice.

For Jennifer, the radiolucency extends into the dentin, the test result is now positive and so Dr. Goodcare shows her **Fig. 1**. According to the graph, the post-test probability of cavitation, given a pre-test probability of 60 per

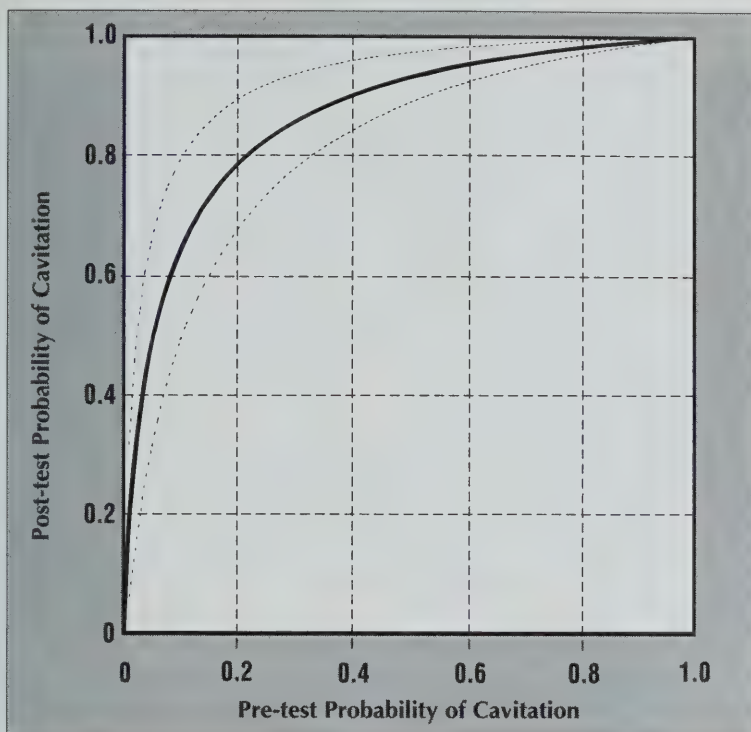


Fig. 1: Pre-test and mean post-test probability of cavitation (± 95 per cent confidence interval) based on a positive radiographic test result.

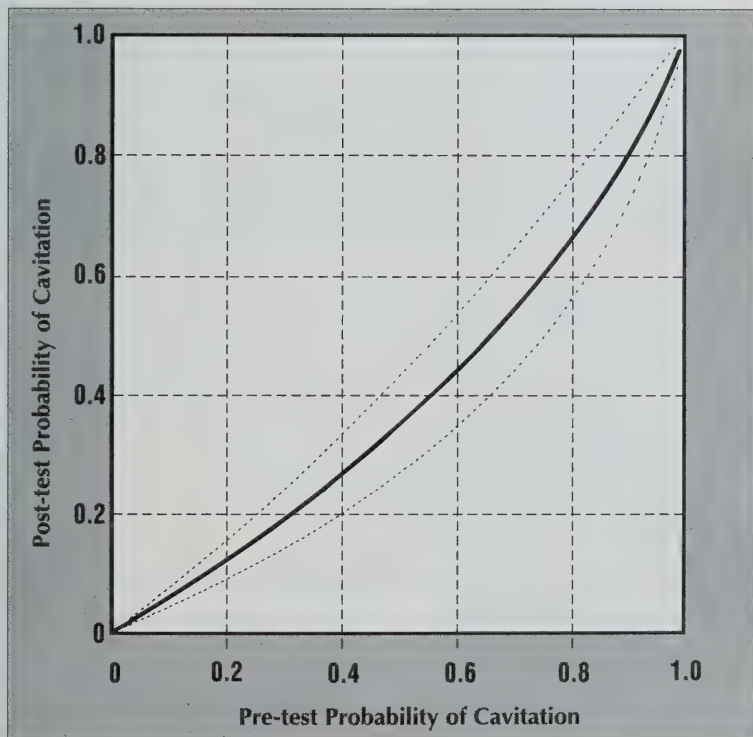


Fig. 2: Pre-test and mean post-test probability of cavitation (± 95 per cent confidence interval) based on a negative radiographic test result.

cent, is now approximately 95 per cent. In other words, she explains to Jennifer, it is extremely likely that the lesion is cavitated. Dr. Goodcare

informs Jennifer of the likelihood of the lesion progressing during the next few months to the point where it will cause pain. Jennifer's options

are more limited than Tom's since remineralizing solutions are unlikely to have any effect. If Jennifer chooses not to have the tooth restored now, she should return in two to three months for reassessment. With this information Jennifer can make her choice.

Discussion

Decision-making in health care requires assembly of all the clinical findings, reference to the professional's unique body of knowledge, and accurate communication to patients for their informed choice. However, the ground on which professionals reference their findings and communicate diagnoses is shifting as more and more evidence is published, as old and new technologies including diagnostic tests are better evaluated,¹² as disease patterns change, and as patients demand to take their rightful place in decision-making. Health care professionals need to find the means to firm up the ground with evidence-based decision-making.

The evidence on the precision of bitewing radiographs has been synthesized into two user-friendly graphs. These graphs allow dentists to readily estimate the probability of interproximal carious lesions, apparent on radiographs, being truly cavitated or not.

In this article we have shown how practitioners can use the graphs of the best available evidence to employ an evidence-based approach for their communication to clients. To use the graphs they need only two other pieces of information:

- the prior or pre-test probability of new cavitated, carious lesions in the situation they face, which is based on the findings of a clinical exam and also may include a number of other factors such as past caries experience and oral hygiene.
- an accurate assessment of the depth of any suspicious lesion from a well-taken and well-developed bitewing radiograph.

With the use of these graphs, dentists can take one more step to improve their everyday practices.

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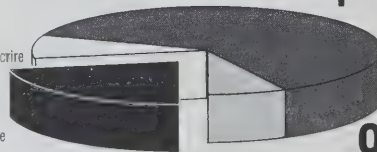
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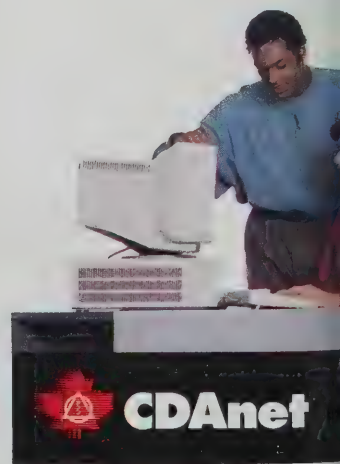
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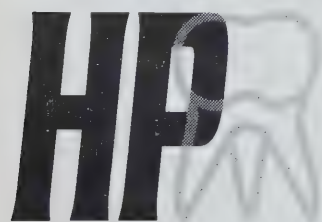
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ONTARIO - Ottawa: Practising endodontist wanted in Ottawa. Please reply to CDA ACCESS Box #2708. (08/09)

ONTARIO - Guelph: Orthodontist/endodontist/associate wanted. We require a full-time or part-time associate, with or without own patient base. Individuals must be highly motivated, caring team players with good communication and clinical skills. We are a computerized practice employing two full-time hygienists. A P.D.A. and an excellent experienced support staff. Associates would work days, extended hours in the evenings and Saturdays. Future buy-in options available. This would be an excellent opportunity for a new graduate or an established individual seeking a busy practice. For more information please call (519) 824-7930.

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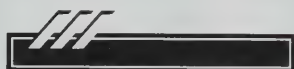
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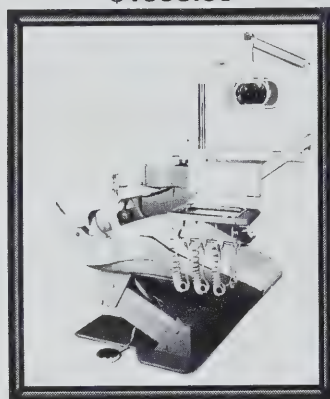
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CDSPI And Dentists: We're Surfing The Internet!

Dentists on the Internet? It may sound like the title to some 1950s science fiction flick — but it's not.

In fact, surfing the Net is a great way for dentists and dental professionals to obtain information about organized dentistry, new techniques, oral health programs, and a host of other dental topics.

It's also a great way to learn about Canadian Dental Service Plans Inc. (CDSPI). We're on the World Wide Web at: <http://www.cdspi.com>. Our research shows that this is a promising way to electronically introduce and explain our organization and to interact with busy dentists.

You'll be seeing a lot more dentists — of all ages — surfing the global Internet in the near future. The word is out... the Net just might become as familiar a dental tool as the standard mirror and explorer.

And why not? There's a wealth of up-to-the-moment research that's 'out there' for you to access. Dentists can already use the Internet to catch up on the latest treatments in dental health — or join a discussion group with counterparts from around the world.

According to *Computing Canada* magazine estimates, the percentage of Canadians using the Internet has jumped from 18 per cent in June, 1995, to 30 per cent in less than a year. Recent unofficial surveys estimate that 20 to 30 million people around the world are using the Internet right now — and that number is increasing by as much as eight per cent a month.

Some enthusiasts even suggest that by the year 2000, the number of users will be in the hundreds of millions.

There are already studies showing how dentists fit demographically into what is generally known about the average Internet user: highly educated, in an upper income bracket and within easy reach of Web technology. Younger dentists are far more likely to be on-line than established dentists because universities — being central to the Internet system — are making it easily accessible for them.

Some current literature has compared the Internet's status to that of the fax machine when it was first introduced. Like early fax machines, the Net's value as a business tool is still somewhat limited, but it's expected to rapidly become indispensable.

With that in mind, it isn't hard to understand why CDSPI is introducing our own Web site — which will ultimately complement CDA's soon-to-be-launched new Web site, now in the final stages of development.

With a few quick taps on the keyboard, and clicks of the mouse, dentists can now access all kinds of information regarding the insurance and investment programs that we've been administering since 1959.

We realize that dentists are health practitioners as well as business people, so our Web site allows busy dentists to access CDSPI long after most other businesses are closed. In a way, the Web will allow us to be open 24 hours a day, seven days

a week — especially if we can enhance it in the future with interactive features.

Currently, on our Web site, you can discover:

Information On CDSPI

- Our mission statement
- Our mandate
- Our Board of Directors
- The associations that own CDSPI

A Complete List Of Insurance Programs Administered By CDSPI

- Learn what plans are available, how they protect you, and which ones are most suited to you.

A Complete List Of Investment Programs Administered By CDSPI

- Decide which programs are best for you during the short and long terms.

Who Operates CDSPI Day To Day

- Find out who's in charge and who makes up the Executive Team of specialists that guides CDSPI.

How CDSPI Insurance Services Can Assist You

- Find out the many helpful services to assist you with your insurance and investment program.

Planning Tips

- An insurance or investment tip that's updated weekly.

What's New With CDSPI

- Up-to-date reports on what's new at CDSPI, and recent developments concerning the insurance and investment products that we administer.

You can also win prizes, like a *Globe and Mail* personal finance library, just by visiting our site.

We're already looking at new and exciting ways to make CDSPI's Web site more informative and useful to

you. In the future, you may be able to access your CDSPI accounts via the Web, or fill out forms, update personal information and order CDSPI products.

Why not drop us a line and let us know what services you'd like to see us develop for you? Remember, this site has been designed especially with you in mind.

The Web will change the way we look at the world forever. Even in those early science fiction movies, no one predicted anything as simple, accessible and efficient as the Internet. And as more and more dentists start surfing the Net, they'll realize how truly endless the possibilities are.

Feel like going surfing? Here are a few destinations that you might

find helpful, informative — and just plain interesting.

Go Surfing With:

- **Canadian Dental Service Plans Inc. (CDSPI)**
<http://www.cdspi.com>
- **Ontario Dental Association**
<http://www.oda.on.ca>
- **American Dental Association**
<http://www.ada.org>
- **A Smile Is Forever**
<http://www.asmile.com>
(An Internet directory of Canadian dentists. This is a site where dentists can have their own home page created.)
- **University Of Toronto Faculty of Dentistry**
<http://www.utoronto.ca/dentistry>
(This site includes information about community dentistry, the

community dentistry health services research unit, the *Canadian Journal of Community Dentistry* and the *Toronto Dental Journal*.)

- **Dalhousie University**
<http://bpass.dentistry.dal.ca>
(This is the site for their department of oral and maxillofacial radiology. Interesting patient case studies, educational facts and assorted info are available.)
- **University Of Geneva**
<http://www.unige.ch/smd/orthotr.html>
(This is the dental trauma site of their orthodontics and pedodontics departments. Useful and interesting information on traumatic dental injuries.) ■

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Balanced	✓ 9.3%	9.2%	✓ 8.3%	7.8%	9.3%	9.5%	✓ 8.7%	8.1%
Bond & Mortgage	10.8%	11.0%	✓ 7.3%	6.2%	✓ 10.1%	9.4%	✓ 9.8%	9.2%
Money Market	✓ 5.8%	5.1%	✓ 5.5%	4.9%	✓ 6.0%	5.4%	✓ 8.0%	7.6%
International Equity	✓ 8.6%	6.1%	n/a		n/a		n/a	
European	✓ 8.6%	8.5%	n/a		n/a		n/a	
Pacific Basin	✓ 10.9%	-1.8%	n/a		n/a		n/a	
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[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historic rates based on past performance and are not necessarily indicative of future performance.

* Comparison performance figures are Globe and Mail averages for the range of similar funds offered in the marketplace before sales charges, as published in the August 15, 1996 issue.

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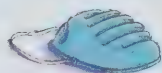
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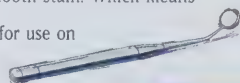


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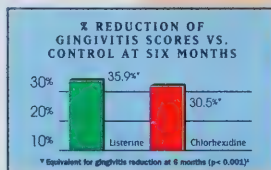
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[†] Gingivitis was evaluated using the Modified Gingival Index. ^{††} Warner-Lambert Company/Warner Wellcome Inc, Scarborough, Ontario M1L 2N3.
¹ Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. *J Clin Periodontol* 1990;17:575-579. **PAAB**
² DePaola LG et al. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol* 1989;16:311-315.
³ Data on file, 1995.

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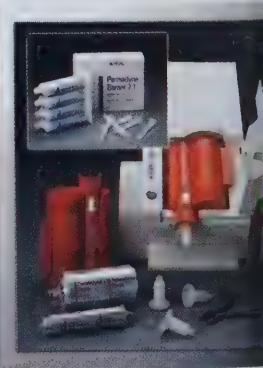
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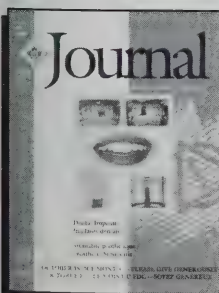
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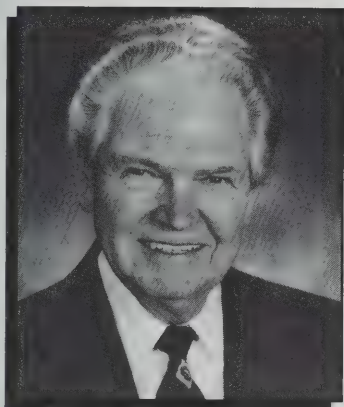
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EDITORIAL

A DIFFERENT PERSPECTIVE



Dr. P. Ralph Crawford,
editor

It has been an unusual summer. Perhaps I'm at a unique stage of life, or maybe it's a combination of too many amalgam fillings and a lifetime of dinners cooked in aluminum pots, but both my wife and I decided to view the world from an entirely new perspective this summer.

Last June, while vacationing in Bermuda, we donned steel diving helmets and briefly walked on the ocean floor. It was an experience we won't soon forget. The world below the sea is indeed a wonder to behold, and I now understand why scuba divers follow their sport with such enthusiasm.

The next thing we did — after years of ridiculing friends for wasting their time on such a useless activity — was take up golf. I hate to admit it, but we are actually enjoying the challenge, and frustration, of trying to hit a tiny ball a long way in a straight line.

But the heart stopper that caused me to pause and think about life's ultimate purpose occurred on a beautiful morning in September. We went up in a hot air balloon. And although some of my more candid friends have since suggested that I provided all the hot air myself, it truly was a different experience.

The day was perfect, the air crisp, and the sky a glorious azure canopy. After the preliminaries of

filling the balloon and scrambling into the basket, the pilot, with a deft hand on the propane burner, lifted us gently off the ground. In minutes, hundreds of feet below, the city of Ottawa and surrounding area were spread out for us to see, just like a patterned carpet.

Apart from the intermittent sound of the burner, it was completely silent, with no sense of motion. For that brief hour in the air, there was nothing but peace and serenity — and an opportunity to view our own little corner of the world in an entirely new way.

As chance would have it, the wind current carried us directly over the part of the city where we live. Although we had no difficulty picking out familiar landmarks, our own residence was just a tiny spot on the landscape below, one of countless thousands. Somehow, from a distance of several thousand feet, it didn't appear quite so important or impressive.

That's when I found myself asking the same question that has plagued so many of the world's great philosophers: 'Is all that we strive and struggle so hard for really that important?'

It's easy to answer no, particularly when you're viewing the world — and your place in it — from such a distance. But then you realize that if it wasn't for our individual lives, our homes, our neighborhoods, our communities, our cities and our countries, there would be no global community. Our individual efforts, even though they may appear insignificant, form an integral part of an infinite whole. And that whole is driven, by some innate desire inside us all, toward a common good — with varying degrees of success.

Dentistry is like this. We tend to be perfectionists, caught up in our own small world. Everything we do in our professional lives is measured in millimetres and micrograms. Perhaps, as if we were in a balloon rising above all the activities of the day, we should take the time to view our dental lives from a different perspective. There may be times when we feel our singular efforts, in our own little offices, don't amount to a great

deal. And we ask ourselves, 'Is it really worth all the effort?'

I think it is. Our efforts are worthwhile because each of Canada's 16,000 individual dental practices, despite being spread out across the length and breadth of the country, are part of a unified whole. This whole is linked together by a mission of common good — preserving the oral health of a nation, and the world.

This is why it is so important to literally feel and be a part of the dental community. To move outside of your office, and participate in your local dental society, or your provincial and national dental organizations. To belong to dentistry's team, and do your part to help the profession deal with the issues of the day.

Not only are the issues facing dentistry numerous, but managing them successfully will be vital to our well-being and the well-being of our patients. Dental benefits issues, including managed care, have the potential to change the way we practise and, more importantly, to erase many of the oral health gains that we've witnessed in Canada over the last 25 years. There are also issues such as taxation, mandatory versus voluntary membership, alternative materials, biofilms, infection control, human rights, and dental education to consider.

Who will plan and manage our future if individual dentists abdicate this responsibility? And if dentists do not become actively involved at the local, provincial, national and international levels of organized dentistry, who will find the solutions to the many challenges facing our profession?

Solutions will only be found when individual dentists move out of isolation and become involved. Perhaps today is as good a day as any to view the dental world from a different perspective, and make a real contribution to the future of your profession.

*P. Ralph Crawford, BA, DMD
Editor of the Journal of the
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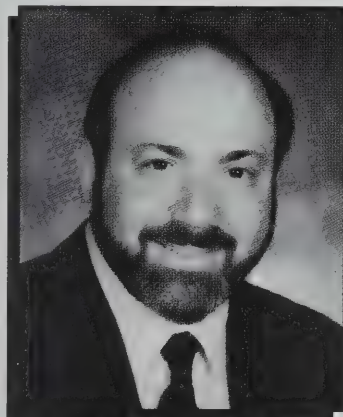
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PRESIDENT'S COLUMN

WHAT DENTISTRY MEANS TO ME



Dr. Barry Dolman,
CDA president

In day-to-day dental practice, finding the time to stop and reflect on the long-term goals of your office — let alone the future of your profession — can be difficult.

But if more dentists took the time to ask themselves one simple question, 'What does the profession of dentistry mean to me?', both their practices and their profession would likely come out ahead.

Like Hamlet's famous "To be, or not to be" query, this question may seem like a ghost out of your past. Chances are that you haven't heard it, let alone considered it, since the day you were interviewed for dental school.

I suspect, however, that if dentists stopped to answer the "what does" question, the underlying philosophy behind their responses would say more about the state of dentistry today than you might expect.

Whether we like it or not, many of dentistry's greatest challenges, and even the changing environment in which we practise, have been self-created. The emergence of denturology, and the push of dental hygiene to become an independent profession, occurred because individual dentists were reluctant to provide basic prosthodontic and hygiene services, or to involve themselves in prevention and patient education.

In effect, we dentists abandoned an area of practice, which led to an imbalance between the demand for these services and the supply. This allowed dental hygiene and denturology to step in and fill the void, as well as to seek a greater scope of practice.

Now some dentists are about to make an equally portentous decision with respect to managed care. At a recent meeting, one of my colleagues confronted me at the end of my remarks on managed care. His retort was: "If we don't jump on the managed care bandwagon, someone else will."

I left the meeting wondering if this dentist's response to the managed care issue was an isolated incident, or a sign of the times.

Are dentists ready to provide discount dentistry to their patients? Are they ready to build their practices on the backs of their colleagues? Do they understand what they will be giving away if they discard the fee-for-service model of dental care that has served our patients and our profession so well for so long?

These are dentistry's "To be, or not to be" questions. And how we answer them, as individual dentists, will ultimately determine the future of our profession.

Every day, when dentists answer the phone or open the mail, they're being assaulted with new marketing schemes promising to manipulate and increase their practice profits. Dentists are being advised to get involved in everything from pyramid product sales to halitosis clinics.

The one thing all these schemes have in common is that they have nothing to do with patient care. What they are all about is merchandising, which begs the question: Is dentistry for sale?

For some dentists, the answer appears to be yes. You really have to wonder about ethics when your colleagues use their professional status to promote products and standards of care to the public, but somehow forget to mention that they are either shareholders in the

company that developed these goods, or paid consultants.

Perhaps I'm being naive. Maybe the profit motive that drives the business world has a place in dentistry, too. Possibly those dentists who put patient care ahead of profits are weak, and should be culled out from the profession so that the rest of us can survive and make even more money. But that's not what I had in mind when I entered the profession, and it has nothing at all to do with what the profession of dentistry means to me.

The dental profession is changing, we all know that. But if we are going to pass on a profession that we can be proud of to the next generation, dentistry's ultimate goal — to provide optimal oral health care to our patients — must take precedence over every other motive.

It's time for the silent majority of dental professionals to wake up and lend their support to organized dentistry. The next time dental plans are spared from taxation, association memberships remain exempt from the GST, or dental amalgam is given a clean bill of health, ask yourself the following questions: Did I pay my dues? Did I volunteer my services? What can I do to make a difference?

I begin my year as CDA president with this message. We need you. We need your support, we need your commitment, and we need your hard work — if we are going to continue winning the day on behalf of Canadian dentists and our profession. If we remain united and proud, dentistry will overcome the challenges that lie ahead. And we will continue to be respected by our patients and their employers, by industry and by our legislators.

This is what the profession of dentistry means to me.

Thank you for giving me the opportunity to make this dream a reality, and to serve my profession as president of the Canadian Dental Association.

Barry Dolman, DMD
President of the Canadian Dental Association

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What do you call a dentist going to Miami in January?

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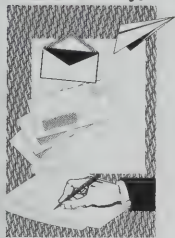
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LETTERS



Managed Care

I read with interest Dr. James Brookfield's letter to the profession dated July 26, 1996, concerning a proposed care management system by Oralife. This is clearly a profit making scheme thinly disguised as a beneficial method of cost containment. I would be shocked to hear of any health care professional believing the statements proposed by this company.

In addition, I have had experiences with managed care in the United States and I can assure your readers that these programs are clearly not in the best interest of the patient. The patients do not receive adequate professional care because the fees are so ridiculously low. I heartily support the CDA's posture on this subject.

Dean P. Gresko, DDS
Thunder Bay, Ontario

I wish to congratulate Dr. Somer for his article "Between Us and Our Patients," published in the August

1996 issue of the *Journal* (62(8):620-622). He is right on the mark! The article should be recommended reading for all fourth-year students and recent graduates who may be the most susceptible to the marketing strategies of managed care companies. Perhaps the CDA could reprint and mail the article to every student upon graduation. Our patients' dental health is too important to be subjected to the marketing games that are and will be played by third parties with bottom-line motivations.

Peter Fendrich, BA, DDS
London, Ontario

Thank You

It is my belief that very often the president of the Canadian Dental Association receives mail requesting favors or complaining about some issue or another. We sometimes forget to say thank you. I wish to take this opportunity to extend thanks to past-president Dr. Jim Brookfield for a job well done in representing the best interests of Canadian dentists. His recent representation on the very important issues of taxation, managed care, government regulation and infection control are very much appreciated.

I am sure there are many CDA members who share my delight in having such strong national representation.

Randall R. Croutze, B.Sc., DDS
Edmonton, Alberta

Infection Control

We feel it necessary to respond to an opinion article published in the June 1996 issue of the *Journal* by Rella P. Christensen PhD, director of Clinical Research Associates ("Infection Control Procedures — Who Should Decide What Cannot Be Used" 62(6):471-473) This article demonstrates the reason why practitioners and others interested in evidence-based decision-making do not rate opinion as useful evidence. Although the author of this article is entitled to her own opinion, sharing that opinion with others gives a greater responsibility. It is possible that the opinion expressed is predicated on the references used. Importantly, the references represent opinions of the Clinical Research Associates in 20/24 or 83 per cent of the papers. Otherwise, one reference is a letter, one is from the *New England Journal of Medicine* and two are possibly not directly related to Clinical Research Associates. In addition, the newsletter of the Clinical Research Associates, while it may be useful reading for many practising dentists, does not represent a peer-reviewed scientific journal. Particularly, when the literature is replete with articles and studies that deal with these issues, it is readily apparent that the opinion expressed may become internally consistent based upon papers written by the author but is not substantiated with a breadth of research evidence.

What do the data suggest is happening? Exposures are relatively common, but infections are very rare among dentists and other health care workers. The injection of blood is very risky, as shown by intravenous needle sharing. The types of needle stick exposures that do not result in mini-transfusions are not infectious not because of any precautions and not because of gloves, but because the virus in the fluid on the needle is not present in amounts that result in infection. Also, the needles used in dentistry are small bore needles that have a low potential for transfer of blood. Aerosols are not infectious for HIV

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(and there is an extensive literature on masks showing they are relatively ineffective for respiratory spread disease) not because of lack of exposure but because HIV attaches to and infects columnar mucosa and not the squamous mucosa of the skin and oropharynx.

We cannot accept the concept behind Rella Christensen's article that protecting oneself from a known HIV positive individual in any way differently than all patients is acceptable. All HIV positive persons have virus present, many of these may not be known to the care provider and hence precautions must be based upon reducing the risk of HIV transmission to the minimum attainable in a prudent practice. If these precautions work, changing procedures because a person is known to be infected is reprehensible and discriminatory. Most interestingly, treating HIV positive patients specially does not materially change the baseline of transmission if routine and reasonable precautions are not taken with every patient.

Continuing study to determine the efficiency of reducing transmissions of virus with the current recommendations continues to be needed more with a view to reducing the recommendations rather than increasing them. Continuing review of guidelines is necessary to assess changes in our understanding of the risk of infection, and effectiveness of infection control materials, devices and procedures. Guidelines must be based upon evidence of need (the risk of infection), and the effectiveness of infection control procedures whenever possible, and not just based upon opinion.

R.G. Mathias, MD, FRCP(C) and
Joel B. Epstein, DMD, MSD
Vancouver, British Columbia

Finally, an admission in the *Journal* that there is no scientific evidence to support the concept of universal precautions (Christensen R.P., Infection Control Procedures-Who Should Decide What Cannot be Used, *J Can Dent Assoc* 62(6):471-473, 1996). Although a few colleagues and I have been emphasizing this for years and it was reported by Steven Sternberg² in

1991, it has never been denied by the Centre for Disease Control (CDC). Dr. Christensen¹ correctly concludes that universal precautions fail because the products upon which they are based are ineffective. This means that a fundamental flaw exists in the profession's response to the HIV/AIDS dilemma. As such, McCarthy et al³ in a recent *Journal* are guilty of misrepresentation when they state that patients, "can attend a dental office where recommended infection control procedures are used, without fear of transmitting HIV to the dental team or other patients."

The praise for Dr. Christensen's statement on universal precautions needs to be tempered by clarification of two claims made by her. The first concerns the transmission of HIV from patients to health care workers. Dr. Christensen infers that six dental clinicians have acquired HIV transmission from patients. However, the CDC⁴ admits that these must be considered as *possible*, not definite transmissions. Therefore, Dr. Christensen may be guilty of misrepresentation.

The second concern relates to the proven quantity of viable HIV in humans. Dr. Christensen is of the opinion that Table I of her article, "clearly shows viable viruses present in the blood of HIV infected persons." Apart from the fact that the table consists of figures and no illustrations of viruses, its numbers are based upon an assumption made by Ho et al,⁵ who used sophisticated tissue culturing techniques and arbitrarily chosen criteria for infectivity to determine the ability of HIV to be transmitted to healthy peripheral-blood mononuclear cells. Ho et al⁵ admitted that even under ideal laboratory conditions for infectivity, which have no resemblance to the human situation, his study was unable to determine what percentage of the infected cells actively expressed the virus. It is unjustified to relate Ho's results to the potential for HIV infection between patients and dental personnel. By making such an extrapolation, Dr. Christensen may be guilty of further misrepresentation.

In an article which describes the continuing paucity of scientific support for handpiece sterilization, Epstein et al⁶ caution that it is unwise to develop infection control recommendations based upon theoretical assumptions from laboratory studies. At least, Dr. Christensen has accepted the fallibility of universal precautions, but she and other authorities need to reassess the profession's entire approach to the HIV dilemma. Until this is accomplished, dentists will continue to perpetuate a myth with the potential for litigation that is even more bizarre than that of wearing an extra disposable gown when the wearing of a single gown has no proven effectiveness.

John Hardie, BDS, M.Sc., PhD,
FRCD(C)
King Fahad Hospital, Saudi Arabia

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Clinical Guidelines

The article "Report on the RCDSO-CDHSRU Workshop on Developing Clinical Guidelines/Standards of Practice" in the July 1996 issue of the *Journal* (62(7):570-577) contained a number of assumptions and conclusions which should provoke discussion in the profession both in Ontario and nationally. The workshop, under the auspices of the Royal College of Dental Surgeons of Ontario (RCDSO) was organized by the Community Dental Health Services

Research Unit (CDHSRU) which is a partnership between the department of community dentistry of the University of Toronto and the public health department of the City of North York. According to the article, the specific purpose of the workshop was to engage participants in a process that the RCDSO council could use to establish standards of practice. Standards of practice have been previously defined by the authors "as guidelines that describe the process of care, which are issued by an authority (such as the RCDSO) for the purpose of providing a benchmark by which care is judged."¹ Further, they state in their report on the workshop that it was self-evident that appropriately worded published guidelines become a standard. Contrast this approach to that of the Institute of Medicine in the United States (IOM) which defines practice guidelines as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."²

There is a world of difference between guidelines as standards issued and used by a licensing body to judge care and those designed to assist the professional in selecting the most appropriate treatment. By the nature of its focus, community dentistry functions in a milieu of care for disadvantaged societal groups, budgets and institutional clinics more likely to provide dental services by protocol. While giving full credit to dentists who serve such a function, this is not a background from which guidelines suited to the delivery of dental services by private practitioners can or should emanate. Both in philosophy and perception of the profession's role in society, it seems very unlikely that such an organization could be expected to command the confidence of practising dentists.

When the RCDSO began issuing its most recent series of clinical guidelines, many in the profession were concerned at the obvious lack of understanding of either acceptable methods of guideline development or the necessity of defining their purpose. Although the workshop organizers understand the

structure of guideline development, the interpretation of the discussions and the conclusions drawn by the authors demonstrate a lack of understanding of the concept of equal participation by professional organizations in the decision-making process. The underlying premise which governed the objectives and the conclusions of the workshop was that the RCDSO and a contractor (e.g. CDHSRU) would determine the topics and gather the evidence in order to produce standards of practice documents. Only then are practitioner organizations and academic dentists involved as reviewers and consultants.

The repeated stress on the development of standards of practice for a licensing authority under the mandate of legislation, indicates a priority of the authors which I doubt is shared by either private practitioners or academics. There was concern expressed at the conference about whether the purpose of guideline development should be educational (clinical practice guidelines) or instruments (standards of care) to judge competence. The authors' preference, as demonstrated in their concluding remarks, is unequivocal. However, in a profession where the delivery of services is almost entirely a function of private practitioners, it is inconceivable that a licensing authority and an organization of community dentists should develop standards of practice, with practitioner organizations and the dental schools only engaged in a limited role as reviewers. The history of guideline development is one of failure in implementation chiefly because these groups were excluded from the decision-making process. Until this fundamental issue is resolved by the profession as a whole, the justifiable distrust of the present process is likely to continue.

*Russell G. Stephens, DDS, M.Sc.
London, Ontario*

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Wall of Fame

We have noted with interest the television advertising campaign and the recent mailing by Procter & Gamble — Crest — concerning the "Wall of Fame" program to encourage young people to get enthusiastic about their dental care. While this is a laudable idea, we are concerned that there is an implication (certainly from the television ads) that the patient must be shown to be caries-free. The implication is that the posting of a photograph on the "Wall of Fame" is contingent on a caries-free radiograph.

We suspect that many children might insist that radiographs be taken to prove their eligibility for the program. This would be contrary to current guidelines concerning the frequency and purposes of radiographic examination of children. Practitioners are cautious about their use of radiation.

Unnecessary radiation in the young is a special concern since their longer life expectancy results in greater potential for deterioration radiation effects. We should abide by the principle of justification, and only take radiographs when there is a reasonable expectation that a problem is present that only radiography can reveal.

Fortunately, when contacted, officials from Procter & Gamble understood these concerns. We understand that P&G has moved expeditiously to revise the Wall of Fame program to maintain its commendable encouragement of enthusiasm for dental care, without the implied link to dental radiographs.

*J.A. Reid, DDS, FAADR, S.L.
Kogon, DDS, M.Sc. and R.G.
Stephens, DDS, M.Sc.
London, Ontario*

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L'avenir de la médecine dentaire

C'est avec un sentiment d'inconfort que j'ai lu le commentaire du Dr Robert Paquin sur l'avenir de l'enseignement de la médecine dentaire. En tant que professeur de médecine buccale à la Faculté de médecine dentaire de l'Université de Montréal, j'insiste pour dire aux étudiants de ne jamais sous-estimer leurs connaissances dans ce domaine parce qu'ils connaissent les pathologies buccales beaucoup mieux que nos collègues médecins généralistes.

Le programme de chirurgie buccale et maxillofaciale de l'Université Laval, dont fait partie le Dr Paquin, comporte deux années d'externat à la faculté de médecine. Il est évident qu'un chirurgien buccal se doit de connaître de façon plus approfondie, par exemple, le domaine de l'hémostase, et que s'il arrive à bien maîtriser ces notions, c'est parce qu'il les appliquera sur une base quotidienne. On ne devient confortable avec une situation clinique que lorsque l'on peut mettre en pratique ce que l'on a appris. Je suis persuadé qu'un dentiste ayant à faire face à des patients hémophiles sur une base régulière développerait une approche diagnostique et thérapeutique tout à fait adéquate même si auparavant il n'avait pas eu à traiter des patients souffrant de problème de l'hémostase. Ce n'est pas que l'enseignement ne fut pas offert ou fut de mauvaise qualité, c'est que ce type de situation ne se rencontre pas de façon fréquente dans le contexte de la pratique dentaire en cabinet privé.

Il est évident que l'on ne peut comparer la formation médicale d'un dentiste à deux années intensives de médecine clinique. Dans

certains pays, le programme de médecine dentaire est beaucoup plus long qu'au Canada; les étudiants inscrits au premier cycle ayant à s'intégrer au cours de médecine de façon sérieuse, tout comme le Dr Paquin l'a fait dans le cadre de sa formation de chirurgien buccal et maxillofacial. Je peux vous garantir que les dentistes issus de ces programmes auront en grande partie rapidement oublié ces notions tout simplement parce qu'ils ne seront confrontés qu'occasionnellement à des situations médicales problématiques et que lorsque ces situations se présenteront, ils auront probablement à consulter le médecin traitant de toute façon. Ce fait est reconnu de façon spectaculaire par l'enseignement par problèmes qu'utilisent les Facultés de médecine de Sherbrooke et de Montréal où l'on prend pour un acquis qu'il est inutile de bourrer le crâne des étudiants en les forçant à apprendre (et à oublier?) des pathologies qu'ils auront peu de chance d'observer et qu'il est préférable de donner aux étudiants une méthode d'analyse qui leur permettra de bien traiter leurs patients même s'ils n'ont pas lu les douze tomes d'un atlas de neurologie.

En ce qui concerne notre prétendu «chauvinisme à donner l'enseignement de certaines sciences cliniques à des dentistes plutôt qu'à des médecins spécialistes mieux qualifiés», j'aimerais que le Dr Paquin en fasse la preuve. De plus, je peux affirmer qu'en ayant eu des cours aux niveaux sous-gradué et gradué offerts par certains de ces «médecins spécialistes mieux qualifiés», il m'est arrivé de constater que ces cours n'étaient pas adaptés au contexte dentaire et qu'en bout de ligne, on pouvait douter de l'impact d'un tel cours sur la qualité de l'enseignement.

Lorsque le Dr Paquin dit que le public consulte préférablement le médecin pour le diagnostic et le traitement des lésions buccales, un point important qui semble oublié est le fait qu'au Canada les soins dentaires ne sont pas couverts par notre régime de santé, exception faite des bénéficiaires de l'aide sociale. Cette seule raison peut expliquer pourquoi un nombre

insuffisant de patients consultent les dentistes pour le diagnostic de lésions buccales.

Il est vrai que la pratique de la médecine dentaire comprend de plus en plus de patients médicalement compromis. Cependant, en plus de tout l'aspect médical nécessaire à la pratique de la dentisterie, le dentiste doit également, dans sa formation, apprendre et maîtriser entre autres les principes la chirurgie, de la réduction des risques d'infection et de la relation d'aide. En tant que dentiste pédiatrique, le Dr Paquin doit bien reconnaître la qualité exceptionnelle du dentiste qui parvient à garder sage et exempt de douleur un enfant pour une durée de 30 minutes afin de pouvoir travailler avec des instruments qui pourraient être potentiellement dangereux dans la bouche d'un enfant agité. En ce qui me concerne, je considère que nous réalisons peu souvent à quel point nous travaillons dans des conditions difficiles autant du point de vue technique que comportemental.

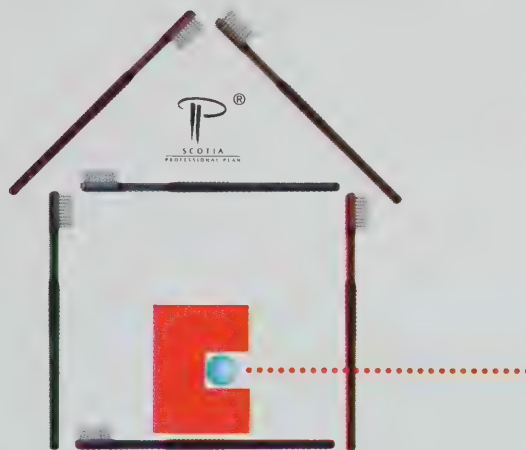
En réponse à votre commentaire que le «jeune dentiste souffre d'une formation médicale de base nettement insuffisante», j'aimerais porter à votre attention qu'il a été démontré dans une étude que les dentistes connaissent mieux les indications et prescrivent de façon plus adéquate que les médecins la prophylaxie antibiotique pour la prévention de l'endocardite infectieuse. Ces faits sont encore plus étonnants lorsqu'on réalise que l'échantillonnage des médecins provient de cardiologues, de chirurgiens cardiaques, de praticiens en médecine familiale et d'internistes.

Je crois que nous avons toutes les raisons d'être fiers de notre profession et que nous avons, tout comme en médecine, à notre disposition des spécialistes pour nous assister dans l'évaluation et le traitement de certaines conditions plus complexes des spécialistes dont fera bientôt partie le Dr Paquin. Je forme le souhait qu'il n'oubliera pas qu'il est (malgré lui?) un dentiste.

Benoît Lalonde, DMD, MSD
Montréal, Québec

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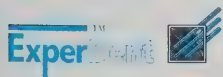
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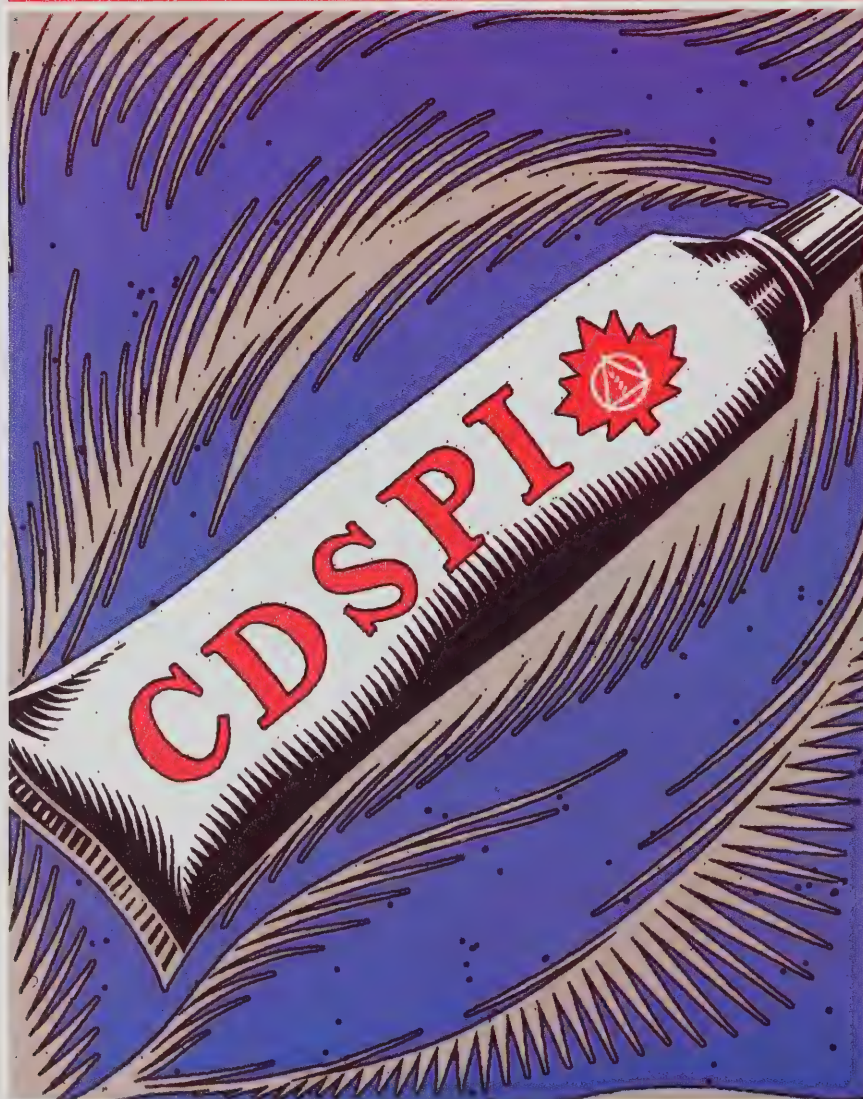
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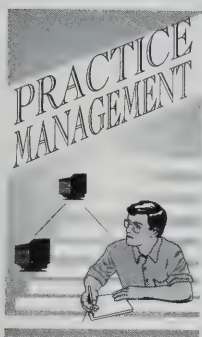
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No Surprises: Key Considerations for Successful Purchase Agreements

Imtiaz Manji, B.Sc.

There's an old saying that goes, "the only certainties in life are death and taxes." In dentistry, another certainty for many dentists is that, sooner or later, they will want to sell their practice. Twenty years ago, when setting up a new dental practice was an economic "sure thing," it was not uncommon for dentists to simply close up shop, take down their sign and salvage their equipment. Today, however, because of competition in the marketplace, goodwill has assumed such a high value that it has become many dentists' biggest asset with the possible exception of their homes.

Today, there is no undiscovered mother-load of under-served dental consumers waiting to flock to a new practice. Dentists who don't want to go through the slow, uncertain process of starting a new practice tend to buy one. Unfortunately, very few dentists are prepared to go through the intricacies of a practice buy/sell agreement. All too often, I am called in to facilitate a transaction that began well but soon deteriorated into feelings of antagonism and confrontation between the principals. In nearly every case, I can trace the cause to a lack of understanding about just what a buy/sell transaction entails, along with a hotly-contested written agreement that nobody thought through in advance.

Transactions that fail typically begin with discussions between the owner and buyer about the possibility of a practice sale. These discussions may be in the context of a brokered deal. They can also be between a host dentist and as-

sociate who have worked together for a time, with the understanding that the associate would be taking over all or part of the practice sooner or later. Both parties have agreed that it is time to make the move, a price has been discussed, and terms of payment agreed to. The prospective buyer then goes to a lawyer to have an agreement legally drafted, but, since nothing other than price and payment has been discussed or decided, the lawyer receives little or no guidance concerning the myriad of other major issues that arise in the course of a practice sale.

Faced with drafting a purchase agreement in which there are no detailed instructions for anything but the purchase price and the payment schedules, the lawyer often considers only his or her own client. The result is an agreement that is almost completely one-sided, which, understandably enough, the seller's lawyer finds unacceptable. Because there has been no proper negotiation in advance, this is now left to the lawyers, whose concern is to get the most they can for their respective clients. In such a proceeding, emotions — and legal bills — can run high. This is bad enough in a 100 per cent practice purchase, but it is usually magnified in associate buy-ins, where there are additional considerations such as staff management concerns, patient transfer issues and facility sharing arrangements, to name but a few. Sometimes the sale goes ahead, bruised feelings notwithstanding, but it is not uncommon for the stress and anxiety to kill a transaction that had great potential for both parties.

The good news is that it doesn't have to be this way. All it takes for a smooth transaction and an agreement that satisfies both parties is to think through the issues in advance and negotiate an acceptable understanding around each of them with the help of an experienced advisor. To do this, you need to know what issues cause the greatest anxiety for both vendors and buyers — the real "deal-busters."

What Is For Sale?

It is essential for both the vendor and buyer to know exactly what is being sold. Preparing a detailed, written list of assets ensures that the seller has performed a detailed accounting of what he or she owns. Just as critical, there must also be a list of the assets to be excluded from the sale. Without such a list, the vendor can find him or herself haggling over items of great sentimental or other value that they had no intention of selling.

When you buy a practice, you need to determine if there are any existing leases or material contracts, such as equipment and computer leases, service agreements, maintenance contracts and supplier agreements, and if these can be assigned to you. If so, you should also decide if you will assume them or if the vendor should pay them out.

Facility leases are of particular importance. New dentists need stability while they build up their practices. It is important to find out when the existing lease expires, and under what terms it can be extended. It is not uncommon for rents to increase significantly on the renewal of a lease, particularly



if the lease was long term. A practice struggling to become re-established under new ownership can be driven to the brink of bankruptcy under the impact of a 200 or 300 per cent rent increase.

Although patient charts are by far the most valuable part of practice goodwill, there are other goodwill components that buyers and sellers must consider, such as the practice name, phone number and signage.

No matter how carefully buyers investigate their intended purchases, it's very difficult for them to get a handle on what they are buying. If the dentist is not an associate in the practice, it's a good idea to "test drive" the practice (without making any announcements to the patients) for a short period of time prior to the closing date of the purchase agreement. This allows the buyer to see how the practice and its staff really work.

Understandably, this type of arrangement is not one that vendors are very enthusiastic about. Practice test drives are rare, and they usually only occur if all other terms and conditions of the sale are agreed on by both parties, and the buyer agrees to make a non-refundable deposit. Buying a new business is a risk, however, and the cost of the deposit may be a worthwhile investment.

Patient Transfer

When you buy a practice, you are buying its equipment, leaseholds and goodwill. Goodwill is made up of several parts, but the most important component is the value of the patient base. If you are buying 50 per cent of a practice, you are entitled to 50 per cent of the patient base. But, since less than 50 per cent of the patients may be willing to transfer their loyalty, buyers should insist on specific measures to accomplish this objective. These measures could include training staff in appropriate verbal skills to promote the new dentist to patients, creating and mailing patient newsletters or announcements, or developing and promoting a new practice identity.

In addition to these basic measures, there are other ways to protect buyers from ending up with

less than their fair share of patients. These include:

1. Allocating all new patients who are willing to be treated by either practitioner to the new dentist. This would continue until the patient base was equally divided.
2. Adding an adjustment clause that comes into effect after a given amount of time, for instance, two to three years, that financially compensates the buyer if less than 50 per cent of the patients have been successfully transferred. Another option is to share hygiene revenue and expenses equally to help achieve equality of revenue.

Even in 100 per cent practice purchases, patient transfer can be problematic. Patients accustomed to a mature practitioner can leave a practice in droves when a younger dentist takes over. This problem can often be overcome if the vendor works as a locum, and helps to introduce the new dentist to staff and patients. It's also helpful to establish a marketing budget to promote the new dentist, and thereby protect practice goodwill. Most evaluators assume a certain patient loss when evaluating a practice. If the actual patient loss exceeds this allowance, you lose goodwill that you have paid for. Conversely, marketing effectively could help you to retain patients the evaluator assumed you would lose, making your purchase a better deal than you expected.

Employees

When a practice sale occurs, the staff are usually terminated and become eligible for notice or severance. In the case of long-term employees, severance can amount to a substantial sum. It is therefore in the seller's interest to have the new owner re-hire the staff. At the same time, it is in the buyer's interest to have experienced people in the practice to provide continuity throughout the ownership change and to continue providing quality services to patients. Buyers need to be aware that re-hired staff may bring their seniority with them into their new jobs, however. If there is a subsequent lay off, the new owner may have to pay severance based on the total length of serv-

ice, not just the time the staff member worked for the new owner.

When an associate becomes part owner of a practice, issues arise concerning the hiring of new staff, who will keep working for the vendor, and who will be shared between dentists. How shared staff will be managed and supervised must also be addressed.

There is no easy solution to staff issues. Sellers naturally want people they have worked with to keep their jobs, and to avoid paying out large sums for severance. It is equally understandable that new owners want maximum flexibility when it comes to the number of staff they hire and their rates of pay. The key for both parties is to be aware of the issues beforehand, and to discuss them thoroughly to find a mutually agreeable arrangement.

Restrictive Covenants

The most important asset a practice possesses is its patients. If the previous owner of the practice you buy opens a new practice nearby, you will lose much of the goodwill you have paid for. Restrictive covenants are legal devices that protect buyers from this possibility, usually by excluding the previous owner from practising in a specified geographical area for a specified time. It is essential for buyers to ensure they are protected by a restrictive covenant in their purchase agreement.

Buyers should insist on a non-solicitation clause for patients and staff, which prohibits the previous owner from soliciting any patient or staff member, as well as an injunctive relief clause, which is a court order preventing vendors from violating the restrictive covenant. Its purpose is to provide speedy relief to the injured party, avoiding a wait of months or years for the matter to come to court.



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Insurance

Vendors are typically responsible for insurance — and any loss or damage — up to the closing date. This responsibility transfers to the buyer on the closing date, and he or she should buy proper insurance coverage effective from that date forward. Buyers should make sure that there is a clause in their agreement releasing them from the purchase in the event of substantial damages to the premises or equipment prior to the closing date. A practice that is burned to the ground or flooded is no place to get started in dentistry.

Billings

Failure to properly negotiate the collection and allocation of accounts receivable can cause a lot of bad feelings even when a purchase agreement has been signed, sealed and delivered. The purchase agreement should specify the new owner's obligations with regards to collecting money owed to the previous owner. In many cases, the new owner buys the accounts receivable according to a sliding scale based on the "age" of the accounts. For example, the new owner pays 90 per cent of the value of current accounts, 50 per cent of the value of accounts outstanding from 60 to 90 days, and nothing for accounts over 90 days (except for those receivables subject to financial arrangements which are calculated at 90 per cent).

In summary, the buying and selling of a practice involves much more than a sale price and a payment schedule. The most important factor in a successful purchase agreement is to make sure that there are no surprises for either the vendor or the buyer. This takes a frank exchange of information, proper planning, investigating, discussion and negotiation. You should also involve your advisors from the very beginning of the process. Getting the issues out in the open right from the start will make your negotiations go more smoothly and quickly, save a lot of wear and tear on your nerves, and save you time, money and stress in the long run. ■

LIBRARY PACKAGE

This month, the CDA Resource Centre has developed a package of articles of interest to dentists on **FIBROMYALGIA**. The package is available to CDA members for \$5, plus applicable taxes, and to non-members for \$10, plus applicable taxes.

NEW ACQUISITIONS

Scully, C. and Welbury, R. *Color Atlas of Oral Diseases in Children and Adolescents*. Wolfe, 1994.

Terezhalmay, G.T. and Hatch, C.L., eds. *Pharmacologic Management of the Medically Compromised Patient*. Dental Clinics of North America, July 1996.

All of the Resource Centre's texts are available for loan to CDA members — please contact us for fee information. To order this month's package, or to borrow a book or video, please contact the CDA Resource Centre at:

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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1996-97 quiz will appear in the June 1997 issue of the *Journal*. Answers to the quiz will be published in the August 1997 issue. Dentists who complete the quiz may be eligible to receive continuing education points, and their names will be forwarded to their provincial licensing bodies for consideration.

Questions 1 through 5 are a repeat of the questions that appeared in the September issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 6 through 10 are new questions — watch for the answers and rationales next month. Keep all copies of the *Journal* so you can correctly respond to the June 1997 quiz.

QUESTION 1

On a recall examination of a 78-year-old patient, you find lesions on the roots of teeth 1.5, 1.6 and 1.7. Each lesion is soft and shallow with a surface defect of not more than 0.5 mm in depth. You would

- (1) polish the lesion with pumice.
- (2) recontour the root surface, smooth and polish.
- (3) apply topical fluoride.
- (4) introduce chlorhexidine therapy.
- (5) restore the teeth with glass ionomer cement.

- A. (1) (3) (4)
B. (2) (3) (4)
C. (3) and (4)
D. (5) only

ANSWER: B

RATIONALE:

Root caries affects approximately two-thirds of the elderly population. Patients at risk to root caries would appear to have not only colonization of *Actinomyces viscosus* on the root surface but also high numbers of lactobacilli and *Streptococci mutans*. To date, the major associated bacteria are the lactobacilli. Another factor increasing risk is diet, and in particular sugars and fermentable carbohydrates. Quantity and quality of saliva in the elderly is also causative since there is both a reduced flow of saliva with age and many medications commonly prescribed for the elderly tend to induce xerostomia. Other risk factors include gingival recession, decreased fluoride intake and poor oral hygiene often associated with reduced manual dexterity and disinterest. As with other age groups, preventive measures

must be emphasized. In this age group motivation of the Patient is an added challenge.

In the above patient with lesions of only 0.5 mm in depth, conservative reshaping of the root surfaces is advocated followed by smoothing and polishing. Thereafter, topical fluoride and chlorhexidine therapy is prescribed.

According to Galen and Lynch (1994) treatment of root caries lesions should be based on texture and shape as follows:

Lesion	Treatment
Incipient No surface defect, soft, penetrated by dental explorer	Polishing
Shallow Surface defect 0.5 mm in depth, soft, irregular, rough, penetrated by dental explorer	Recontouring and smoothing
Cavitated Surface defect greater than 0.5 mm in depth, soft texture	Glass ionomer cements

In addition to the above, topical fluoride and chlorhexidine therapy must be part of the regimen as well as sugar substitutes and recall assessment.

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- 2) Galen, D. and Lynch, E. Epidemiology of root caries. *Gerodontology* 10:59-71, 1993.
- 3) Brighton, D., Lynch, E. and Heath, M.R. A microbial study of primary root caries lesions with different treatment needs. *J Dent Res* 72:623-629, 1993.

QUESTION 2

Which of the following tissues is/are at risk when performing vital bleaching procedures for a discolored tooth?

- (1) enamel
 - (2) dentin
 - (3) gingiva
 - (4) pulp
- A. (1) (2) (3)
B. (1) and (3)
C. (2) and (4)
D. (4) only
E. All of the above.

ANSWER: E

RATIONALE:

A recent review has elicited guidelines for the bleaching of vital teeth. In all instances gingival tissues can be damaged, especially if bleaching solutions of high concentration are used. To prevent accidental exposure of gingival tissues to the solutions, a rubber dam should be applied to ensure that the gingivae are protected. Teeth should be checked for any exposed dentin and/or enamel fractures. Bleaching times and solution temperatures should be kept to a minimum. Exposure of dentin can occur when abrasive bleaching techniques are used, since they can remove significant amounts of enamel. When bleaching enamel, especially near the cervix of the tooth, where the enamel is thin, special care is required and a "base" should be applied to reduce chances of cervical resorption and exposure of dentin.

Since 1989, home bleaching techniques have been popular as the public demand for improved esthetics has increased. To evaluate home bleaching Sterrett (1995) studied patients using 10 per cent carbamide peroxide in a night guard over a 14-day period to determine the effects on the periodontium and the enamel of the dentition. Results indicated that there was an increased tooth sensitivity after treatment but that this was transient. Using measurement criteria for crevicular fluid flow, gingival recession, pocket depth, bleeding index and plaque indices, no adverse effects on the periodontium were identified.

Therefore, patients should always be advised that thermal sensitivity may occur after any bleaching procedure and that this may persist for several days.

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- 3) Nikiforuk, G. *Oral Care Report*, Vol. 4, No. 3, 1994.
- 4) Nikiforuk, G. *Oral Care Report*, Vol. 5, No. 3, 1995.

QUESTION 3

Which of the following will prevent cross-infection in the dental office?

- (1) Cold disinfection of burs.
 - (2) Disinfection of water lines.
 - (3) Wiping air/water syringe tips with isopropyl alcohol.
 - (4) Autoclaving of handpieces.
- A. (1) (2) (3)
B. (1) and (3)
C. (2) and (4)
D. (4) only
E. All of the above.

ANSWER: C

RATIONALE:

Cross-infection is defined as the transfer of pathogenic microorganisms (bacteria and viruses) from one person to another. The dentist must assume that every patient may be a carrier of infectious viruses or bacteria. It is the dentist's responsibility to practise appropriate cross-infection control and to ensure that staff in the dental office are familiar with and also practise effective control measures. This must include appropriate sterilization methods for all dental instruments including handpieces. Appropriate barrier techniques, e.g. gloves, masks and protective eye wear should be employed when necessary.

The World Health Organization has raised public concern regarding infection control in the dental office. This particularly relates to dental handpieces, air/water syringes and dental burs.

Heat sterilization of handpieces for every patient increases cost and may damage the handpiece. Steam autoclaves such as the "Statim" allow for fast turnaround, and thus a reduction of the number of handpieces required. However, the handpiece has to be of high quality. Clinical tests have indicated that the Kavo and Lares handpieces have the necessary qualities.

Air/water syringe tips require initial ultrasonic cleaning followed by standard cycles in steam, chemical vapor or static-air dry heat sterilizers. A common problem for both handpieces and syringe tips relates to the air/water lines since they become contaminated with biofilms. Biofilms are masses of microbes embedded in a matrix which supplies them with nutrients. The films

are 30 to 50 microns thick. The lumen of dental unit water lines forms an ideal incubator for bacterial growth. The dislodgement of bacteria from the water line puts patients at risk for cross-infection.

One solution to the problem of biofilms at present is the use of clean water systems as available in dental units from A-dec, Kavo and Siemens. Although non-toxic disinfectants can be introduced, a preferable method is to use a closed-end distilled water supply and periodic disinfection of water lines.

Certain other practices in the office will reduce the risk of air/water line contamination. These include the installation of antiretraction valves, i.e. one way flow from the tubes to the handpieces and syringe tips. Handpieces after use on a patient should be run for a minimum of 20 to 30 seconds to discharge water and air. Handpieces and air/water syringes must be removed to allow open water and air lines to discharge for a period of time between patients as well as for several minutes at the start of the day.

The dental bur requires sterilization by dry heat, steam autoclave or chemical vapor, but these measures drastically reduce the cutting efficiency of the bur. Certain burs are now available which have been manufactured as low cost "throw-away" items, thus increasing efficiency and eliminating cross-infection and by this the 1992 Infection Control Recommendations of the American Dental Association regarding burs are fulfilled.

REFERENCES:

- 1) Clappison, A.R. Cross contamination control and the dental handpiece. *J Prost Dent* 73(5):492-494, 1995.

- 2) Watkins, T.L., Sheldrake, M.A., Miller, C.H. et al Sterilization of reusable air/water syringe tips. *Am J Dent* 7(6):348-350, 1994.
- 3) Molinari, J.A. Practical infection control for the 1990s: Applying science to government regulations. *JADA* 125:1189-1197, 1994.
- 4) Nikiforuk, G. *Oral Care Report* Vol. 4, Nos. 1 and 4, 1994.
- 5) Infection Control Recommendations - supplement to the *JADA*, August, 1992.
- 6) Shearer, B.G. Biofilm and the dental office. *JADA* 127:181-189, 1996.

QUESTION 4

Which of the following anesthetic solutions is the most appropriate for local anesthesia in a child weighing 40 lbs?

- A. two per cent lidocaine with 1:100,000 epinephrine (3.6 cc).
- B. three per cent mepivacaine plain (3.6 cc).
- C. four per cent prilocaine plain (3.6 cc).
- D. Any of the above.

ANSWER: A

RATIONALE:

The maximum recommended dose (MRD) of lidocaine and mepivacaine is 2 mg/lb body weight and of prilocaine 2.7 mg/lb body weight (Table I). Thus, a 40 lb child can tolerate only 80 mg of lidocaine or mepivacaine and 108 mg of prilocaine which allows for two cartridges of two per cent lidocaine with 1:100,000 epinephrine but only 1.5 cartridges of three per cent mepivacaine plain or four per cent prilocaine plain. On a volume basis there exists a lower safety margin for the

Table I

Dosage (mg) of Local Anesthetic Contained in Cartridges of 2 per cent Lidocaine with 1:100,000 Epinephrine, 3 per cent Mepivacaine, and 4 per cent Prilocaine.

No. of Cartridges	2% Lidocaine with epinephrine MRD = 2 mg/lb	3% Mepivacaine MRD = 2 mg/lb	4% Prilocaine MRD = 2.7 mg/lb
1	36 mg	54 mg	72 mg
1.5	54 mg	81 mg	108 mg
2	72 mg	108 mg	144 mg
3	108 mg	162 mg	216 mg
4	144 mg	216 mg	288 mg
5	180 mg	270 mg	360 mg
6	216 mg	*	*
7	252 mg	*	*
8	288 mg	*	*
9	*	*	*

* Exceeds maximum recommended dose (MRD) for a 150-pound or greater adult.

latter two solutions. Some clinicians argue that the use of three per cent mepivacaine plain or four per cent prilocaine plain gives shorter duration of soft tissue anesthesia and fewer instances of lip, cheek and tongue biting. In fact, while pulpal anesthesia is relatively short lived, soft tissue anesthesia may still last three to four hours after a mandibular injection with all of these agents. However, the lessened safety value of these solutions has led to several cases of mortality in young children. Thus the use of prilocaine and mepivacaine in small children should take this into account.

The use of a vasoconstrictor with a local anesthetic, lessens the degree of toxicity of the anesthetic agent because of local containment and slower release to the systemic circulation. Local anesthetics are central nervous system depressants. Although the initial clinical signs of a toxic reaction to a local anesthetic may be excitement and apprehension, including shivering and tremors, this excitation results from the depressant action of the drug on inhibitory centres in the cerebral cortex. Local anesthetic drugs because they are depressants will decrease the pulse rate and blood pressure as well as respiration. Avoidance of overdose is important and dosage guidelines must be followed. Immediate first aid in cases of toxic reaction is positive oxygen ventilation.

REFERENCES:

- 1) Hersh, E.V. Local anesthetics in dentistry: clinical considerations, drug interactions and novel formulations. *Compend Contin Educ Dent* 14:1020-1030, 1993.
- 2) Allen, G.D. *Dental anesthesia and analgesia (Local and General)*. 2nd ed. Baltimore: Williams & Wilkins, Chapter 6, 1981.
- 3) Nikiforuk, G. *Oral Care Report*. Vol 4, No. 3, 1994.

QUESTION 5

The most likely cause of unsuccessful endodontic treatment of a maxillary first molar is failure to detect a

- A. second canal in the mesio-buccal root.
- B. second canal in the disto-buccal root.
- C. second canal in the palatal root.
- D. canal in an extra root.

ANSWER: A

RATIONALE:

At least 72 per cent of maxillary first molars have a double canal system in the mesio-buccal root. Straight line access to the apical foramina of a root canal system is essential for clinical success. Each endodontic access opening must be capable of modification depending on clinical need. Whereas a triangular opening has been traditionally used, Christie and Thompson (1994) consider that a two-stage access approach is more beneficial both for

location of extra canals and their management. They advocate the super-imposition of a No. 4 round bur on the tooth radiograph to judge the size and depth of the pulp chamber prior to entry. The suggested first step is to make a deep oval Class I type cavity parallel to the mesial marginal ridge. In the second step, penetration of the pulp chamber is directed towards the palatal root and the roof of the pulp chamber is removed at the same depth with the undersurface of the No. 4 round bur.

Use of the two-stage approach as described improves vision of the canal orifices and allows identification of any additional canals that may be present. It further avoids weakening of the dentin walls and reduces the possibility of perforation into the furcation area of the root system. The round bur provides a smoother dentin surface which blends the chamber walls and the cavity outline together.

Curettage of the pulp floor is required, both for removal of pulpal remnants and also to provide a fuller view of the root system. This is best done with a long shanked spoon excavator. The orifice of the fourth canal is located directly under the mesio-buccal pulp horn. The canal is very fine but where a groove is found running palatally the presence of an extra canal should be suspected. Such a canal is rarely round, but rather fin-shaped, and should be negotiated with a fine flexible file. The Gates Glidden No. 2 bur must be used with care at low speed to remove overhanging dentin and give direct straight line access to identify each canal for size and direction prior to root filling.

REFERENCES:

- 1) Christie, W.H. and Thompson, G.K. The importance of endodontic access in locating maxillary and mandibular molar canals. *J Can Dent Assoc* 60:527-536, 1994.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 6

Panoramic tomography, when compared to full mouth intraoral radiography, exposes the patient to

- A. a higher radiation dose.
- B. a lower radiation dose.
- C. the same radiation dose.

QUESTION 7

Which of the following cements provide(s) the best seating and retention for complete crowns?

- (1) Zinc oxyphosphate.
 - (2) Conventional resin cement (Comspan).
 - (3) BIS-GMA composite resin cement (Panavia).
- A. (1) only

- B. (2) only
- C. (3) only
- D. (1) and (2)
- E. (2) and (3)

QUESTION 8

The use of porcelain laminates is contraindicated for

- (1) teeth in parafunction.
- (2) closure of a 1.0 mm diastema.
- (3) teeth with fluorosis.
- (4) heavily restored teeth.

- A. (1) and (2)
- B. (1) and (4)
- C. (2) and (4)
- D. (2) (3) (4)

QUESTION 9

For the treatment of a patient with advanced adult periodontitis you would

- A. perform scaling/root planing concurrently with a systemic antimicrobial.
- B. prescribe an antimicrobial for one week and then perform scaling/root planing.
- C. perform scaling/root planing and one week later prescribe a systemic antimicrobial.
- D. perform scaling/root planing only.

QUESTION 10

A patient comes to you for a second opinion because she has been told that the amalgam restorations in her mouth are toxic and therefore should be removed. You would advise her

- A. to consult with a dermatologist.
- B. to consult with an immunologist.

- C. to have all amalgams removed and replaced with alternative materials.
- D. that no evidence exists to show that amalgam restorations are toxic.

(Answers to questions 6 to 10 will appear in next month's Journal.)

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Bisco, Colgate, the Fowler-Pearce Partnership (ScotiaMcLeod), Nobel Biocare, and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education credits required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education credits.

Funding for the SLSA program has been provided by:

Colgate

SciCan
Science Serving Health

FOWLER-PEARCE PARTNERSHIP
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Health Canada Releases Amalgam Policy

Health Canada released its much-anticipated position statement on dental amalgam August 21.

Although the position statement is largely compatible with both CDA's policy on dental amalgam and its dental amalgam patient information sheet, there are some areas of concern.

CDA has asked Health Canada to provide an annotated scientific bibliography in support of the position statement's recommendation on galvanic effect, which states that "new amalgam fillings should not be placed in contact with existing metal devices in the mouth, such as braces." The association is also seeking the scientific basis for Health Canada's recommendation that "amalgam should not be placed in patients with impaired kidney function."

As reported in the President's Letter and information package that CDA sent to all licensed Canadian dentists in September, the association believes that both recommendations amount to clinical practice guidelines, which have been presented by Health Canada without the detailed evidence-based foundation required by the profession.

Health Canada's position statement also recommends that "whenever possible, amalgam fillings should not be placed in or

removed from the teeth of pregnant women." This statement is consistent with the wording of CDA's dental amalgam patient information sheet, which suggests that dentists may recommend alternative restorative materials, other forms of treatment, or delay treatment, for these patients.

"CDA recognizes that Health Canada is responsible for judging the safety of the medical devices and materials sold in Canada," said CDA president Dr. Barry Dolman.

"The recommendations contained in Health Canada's statement constitute a government policy which the profession and individual dentists cannot ignore at the risk of legal liability ... CDA believes that our revised dental amalgam patient information sheet presents appropriate information to assist patients and dentists in planning restorative treatment. It accurately reflects Health Canada's position statement on dental amalgam, but from the perspective and context of the priorities of overall patient care."

Dentists wishing to obtain copies of CDA's dental amalgam patient information sheet, or other pertinent materials such as the *Management of Hazardous Wastes In the Dental Office* manual, should call: 1-800-267-6354. ■

CDA Board Approves Ethical Statement On Adverse Drug Reactions

CDA's board of governors has approved a new ethical statement on adverse reactions to drugs and dental devices.

Developed by the committee on ethics, the statement advises dentists who suspect "the occurrence of an adverse reaction to a drug or dental device" that they have an obligation to communicate this information to the broader medical

and dental community.

"A reasonable suspicion of an adverse reaction is sufficient to trigger the dentist's obligation, as multiple reports of a suspected reaction to the same drug or device will help to identify those cases where an investigation is warranted. When justified, this information can then be conveyed to the broader medical and dental community through advisory statements by Health Canada's Health Protection Branch."

The board approved the new statement in August, during its annual meeting in Montreal. ■

BDA President Attends CDA 1996 Convention



Mr. President, Meet the President! Dr. James Brookfield, who completed his term as CDA president August 21, welcomes Dr. Stuart Blair, the president of the British Dental Association, to the CDA annual meeting and Convention in Montreal.

New Dental School to Open in Florida

After 10 years of dental class reductions in both the United States and Canada, and the closure of six dental schools south of the border, Florida's Nova Southeastern University has announced the opening of a new, private dental school.

The new school, to be located in Fort Lauderdale, is set to open in the fall of 1997. University administrators anticipate that the inaugural class will consist of 75 predoctoral students, 25 international dental graduates, and 12 graduate students.

When many North American dental schools are struggling to remain open, several prominent dentists, including the editor of the *Journal of the American Dental Association*, Dr. Lawrence H. Meskin, are questioning the need for a new dental school.

"This new educational venture has left many dental educators and practitioners puzzled," said Dr. Meskin, who made his comments in an editorial that appeared in the August 1996 issue of *JADA*. "Why, at a time when most academic health centres are battling to maintain the fiscal integrity of their existing programs, is a new dental school being considered?"

Nova Southeastern's decision to open the school appears to be based on the results of a recent feasibility study, and an extensive review by a panel of university officials. The study concluded that Florida's population will increase by 14 million during the next 30 years. It also determined that 12 per cent of the state's residents live in the 40 per cent of Florida counties that are currently designated as being dental shortage areas.

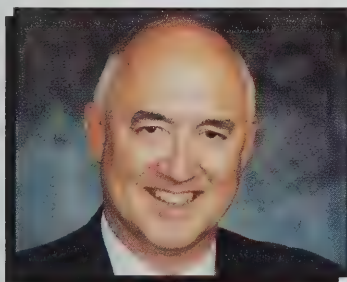
Students will bear most of the financial burden of attending Nova Southeastern's new dental school, with annual tuition fees expected to reach as much as \$45,000.

This, Dr. Meskin believes, would be disastrous. "Access to dental education soon would be limited to the wealthy or those willing to accept debts as high as \$200,000 for the four-year program," he said. ■

APPOINTMENTS AND AWARDS

CDA Elects New Vice-President

Dr. Richard Sandilands of Edmonton, Alberta, was elected vice-president of CDA August 16, during the association's 77th annual board of governors meeting.



Dr. Richard Sandilands

A member of CDA's board of governors since 1988, Dr. Sandilands was appointed as Alberta's representative to CDA's executive council in 1993. He now joins Dr. Barry Dolman, president, Dr. Toby Gushue, president-elect, and Dr. James Brookfield, past-president, on CDA's management committee.

Alberta has appointed Dr. Phil Greeves of Calgary to replace Dr. Sandilands as their representative on CDA's executive council. He will be joined by the members of

CDA's management committee and the remaining regional representatives to the council: Dr. John Diggins, B.C.; Dr. Tom Breneman, Manitoba and Saskatchewan; Dr. George Sweetnam, Ontario; Dr. Louis Dubé, Quebec; and Dr. Burton Conrod, Atlantic Canada. ■

CDA Honors Outstanding Dentists

Prominent dentists from across Canada were recognized for their unique contributions to Canadian dentistry August 17, during CDA's annual awards luncheon.



Dr. Kenneth Bentley, Montreal (l): Honorary Membership. CDA's highest award recognizes individuals deemed to have made outstanding contributions to the art and science of dentistry or to the dental profession over a sustained period of time. The award presentation was made by then CDA president Dr. James Brookfield.

Dr. Kenneth Bentley, the chief of dentistry at the Montreal General Hospital, and the former chair of CDA's council on education and accreditation, received the association's top award, Honorary Membership.



Dr. Derek Jones, Halifax (l), and Dr. Jack Neidermayer, Regina (r): the Distinguished Service Award. CDA's second highest honor recognizes an outstanding contribution in a given year or outstanding service over a number of years.

Several other dentists also received awards during the ceremony, including Dr. Derek Jones and Dr. Jack Neidermayer, who were presented with CDA's Distinguished Service Award.

Dr. Jones has served on CDA's committee of dental materials and devices for 18 years, and is currently the chairman of the commit-

Canadian Forces Dental Services School Holds Graduation Ceremony

Graduation ceremonies for the 11 graduates of Canadian Forces' Dental Officer Training Plan (DOTP) phase 3B program were held at Canadian Forces Base Borden August 2.

Dental students who graduate from the DOTP program are expected to provide an obligatory three or four years of service in Canadian Forces dental clinics, in return for their training and education.

During the summer, students are put through an intensive five-week period of training at Canadian Forces Dental Services' School, located in Borden, Ontario, to become familiar with administrative procedures and the mobile dental environment.

This year's top candidate was lieutenant Chris Rouleau of Laval University in Quebec. ■



CDA president Dr. James Brookfield and Ontario Dental Association president Dr. Elizabeth MacSween meet with Canadian Forces director of dental services, Colonel John Currah, during the mess dinner held during DOTP graduation ceremonies

Toronto Dentist Awarded Order Of Canada

A Toronto dentist was one of the 72 distinguished Canadians named to the Order of Canada this year.

Dr. Donald G. Woodside, a professor in the University of Toronto's faculty of dentistry, and head of the department of orthodontics from 1962-1993, has been appointed as a member of the Order.

Canadian Governor General Roméo LeBlanc will present Dr. Woodside and other inductees with a signed certificate, the insignia and ribbons of the Order, and a special lapel pin in November.

Dr. Woodside received his DDS degree from Dalhousie University in 1952, and his graduate degree in orthodontics from the University of Toronto in 1956. His published work includes studies of both human and

experimental mandibular growth, as well as of the clinical use of functional appliances.

CDA recognized Dr. Woodside's achievements in 1992, when it presented him with its Distinguished Service Award. He is a fellow of the American College of Dentists, and holds honorary membership in the Italian Orthodontic Society, the British Society For the Study of Orthodontics, the Netherlands Society of Orthodontists and the Ontario Association of Orthodontists.

Dr. Woodside has been a distinguished honorary lecturer for the American Association of Orthodontics, and is the 1990 winner of its Ketcham Award. He received an honorary doctorate from the Sweden's Karolinska Institute in 1989.



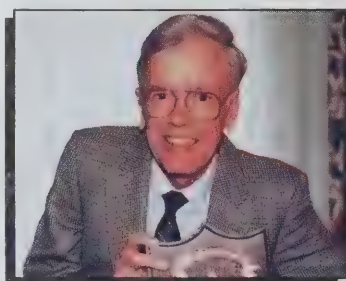
Dr. Donald Woodside

Other Canadian dentists who have been named to the Order of Canada since its creation in 1967 include: Dr. Donald Gullett, 1968; Dr. Gustave LaChance, 1978; Dr. S. Wah Leung, 1987; Dr. Louis Melosky, 1990; Dr. Arthur Wood, 1991; Dr. Jack McDonald, 1991; and Dr. Joseph Aubin Doiron, 1995. ■

tee. Dr. Neidermayer is a past-president of CDA.



Mr. Hyo Maier, president, Aurum Ceramic/Classic Group of Companies, Calgary: the Special Friend of Canadian Dentistry Award. This unique award is presented to deserving non-dentists in appreciation for their friendship and assistance to CDA and dentistry.



Dr. Robert Romcke, Charlottetown (l), and Dr. Henry M. Dick, Edmonton (missing from photo): the Award of Merit. This award is conferred on CDA members who have served in an outstanding capacity in the governing of the CDA or made a similar outstanding contribution to Canadian dentistry.

CDA's Special Friend of Dentistry Award, which was not presented in 1995, went to Mr. Hyo Maier, the president of the Aurum Ceramic/Classic Group of Companies. Mr. Maier and his company have provided extensive support to the Dentistry Canada Fund (DCF) in recent years, and are the sponsors of DCF's annual golf tournament and Million Dollar Shoot-out.

CDA's Award of Merit was conferred on Dr. Robert Romcke of Charlottetown, PEI and Dr. Henry Dick of Edmonton, Alberta. Dr. Romcke has a long and continuous career in public health dentistry at both the provincial and national levels. Dr. Dick has served on numerous CDA committees since 1967 and is a past president of the National Dental Examining Board. ■

Fredericton Dentist Elected New Brunswick President

Dr. R. Daniel Coffin, a Fredericton periodontist, has been elected president of the New Brunswick Dental Society.

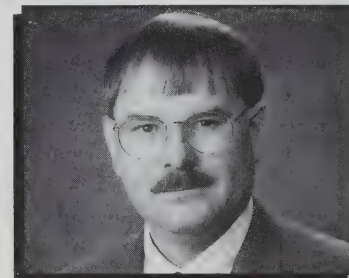
Born in Campbellton, New Brunswick, Dr. Coffin received a bachelor of science degree from the University of P.E.I. in 1970, and his DDS from Dalhousie University in 1974. He maintained a general dental practice in P.E.I. until 1985, when he returned to Dalhousie to pursue a specialty degree in periodontics. ■



Dr. R. Daniel Coffin

Alberta Dental Association Elects New President

Dr. D.R. (Darryl) Smith of Valleyview has been elected president



Dr. D.R. (Darryl) Smith

of the Alberta Dental Association (ADA).

Born in Edmonton, Dr. Smith received a B.Sc. from the University of Alberta in 1976, and a DDS in 1978. He was elected president of ADA during the 90th annual general meeting of the association, held in Kananaskis.



Dr. Huyen Ung

Joining Dr. Smith on the ADA executive are: Dr. D.W. Pettigrew, president-elect; and Dr. W.J. Long, vice-president. ■

Canadian Dentist Wins AAPHD Student Award

Dr. Huyen Ung, who graduated from the University of Toronto's dental faculty this year, has won the American Association of Public Health Dentistry's 1996 First Place Award for Outstanding Achievement in Community Dentistry.

The award was presented to Dr. Ung in September during the association's 1996 conference in Orlando, Florida.

Dr. Ung presented her award winning project, "An Assessment of Oral Health Needs of the Community Served by West Central Community Health Centres," as part of a poster session held during the three-day conference. The project was based on work she completed with a Community Health Centre in downtown Toronto.

Dr. Ung is currently a dental intern at the Hospital for Sick Children in Toronto. ■

Canadian Orthodontists Named to Key Posts with AAO

Two Canadian orthodontists have been appointed to key council positions by the American Association of Orthodontists (AAO).

Dr. W. Douglas Beaton of London, Ontario, was named to the AAO's council on library resources and Dr. Michael D. Rennert of Montreal, Quebec, was named to the council on orthodontic education.

Founded in 1900, AAO is the oldest and largest dental specialty organization in North America,



Dr. Prem Sharma (l), ACD president; Dr. Roger W. Trifshouser, ACD regent; and Dr. Herbert Caplan (r) of Montreal, ACD treasurer for the Quebec section.

with more than 12,000 members in the United States, Canada, and abroad. ■

ACD Presents Scroll of Recognition to CDA President

Representatives of the American College of Dentists (ACD) attended CDA's board of governors meeting in Montreal August 16-17. During the meeting, Dr. Sharma presented an ACD scroll of recognition to then CDA president Dr. James

Dr. Gilbert E. Utas, CDA Past-President

Dr. Gilbert (Gil) Utas, a past-president of the Canadian Dental Association and a long-time resident of Grande Prairie, Alberta, died at the University of Alberta hospital September 1. He was 73.

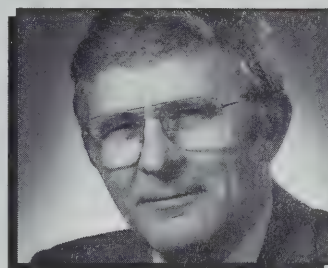
Born in Bashaw, Alberta, Dr. Utas was raised in the Barrhead, Alberta, area, where his family moved when he was three years old. He subsequently served in the Royal Canadian Navy during the Second World War, and was stationed on a number of escort vessels, including a corvette on the North Atlantic, as a wireless operator.

Dr. Utas met his wife, Olive, in Halifax during the war. They were married in 1949, and were together for 44 years until Mrs. Utas's death in 1993.

Following his naval service, Dr. Utas returned to Alberta. After a short career in farming, he obtained a teaching certificate. In 1959, when he and Olive had four children, Dr. Utas entered the University of Alberta's dental faculty. He received his DDS degree in 1964, and immediately began private practice in Grande Prairie.

After faithfully serving his patients and community for over 30 years, Dr. Utas retired from dental practice in 1994.

Dr. Utas' interest in organized dentistry began during his undergraduate years, when he served as president of the dental undergraduate society. By 1968, he was president of the Peace River District Dental Society and in 1975 served as president of the Alberta Dental Association. He was ap-



Dr. Gilbert (Gil) E. Utas, 1923-1996, as he appeared in his official photograph as CDA president in 1980.

pointed as Alberta's representative to the CDA board of governors in 1975, and served as a CDA executive council member from 1977 to 1979. He was elected CDA president in 1980.

During his career, Dr. Utas was honored with fellowships in the International College of Dentists, the Academy of Dentistry International, and the Pierre Fauchard Academy. In 1977, he received the Queen Elizabeth II Silver Jubilee Medal and in 1987 he was awarded the University of Alberta Dental Alumni Association's Outstanding Achievement Award. At the request of the family, an endowment fund has been established in Dr. Utas' name with the Dentistry Canada Fund (DCF). Once the capital of this fund exceeds \$10,000, the annual net income will be used to support dental students from Alberta. Donations can be sent to: DCF (Dr. Gil Utas Fund), 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6. Please make cheques or money orders payable to DCF. ■

Brookfield in appreciation of the continued cooperation between the two organizations. ■

OBITUARIES

Duncan, Dr. Ralph M.: Dr. Duncan of Shawnigan Lake, B.C., died June 24, 1996. He received his dental degree from the University of Alberta in 1944.

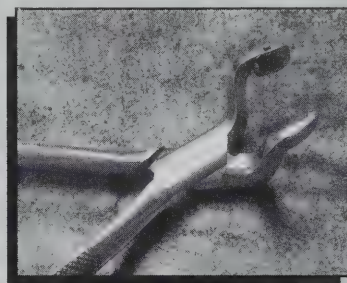
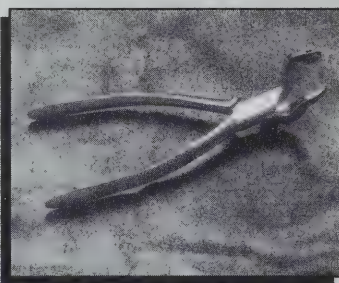
Farmer, Dr. Michel: Dr. Farmer of Pointe-Claire, Quebec, died August 12, 1996. He was a 1975 graduate of the University of Montreal's faculty of dentistry.

Gropper, Dr. Nathan F.: Dr. Gropper died June 17, 1996, at the age of 81. A 1936 graduate of McGill University's faculty of dentistry, he practised in Saskatoon, Saskatchewan, from 1936 to 1974. During this period, he also served four

WHAT'S IT?

The "What's It?" item for this month is a unique forceps that we found recently in a Toronto antique shop. It is a type of forceps that we have not seen before. What makes it unusual is not so much the "W" shaped serration on one beak, but the movable flat plate on the other beak. We would judge that it was used for extracting upper left molars. An obscured identifying mark reads "xxxxvVALIERASONS, NEW YORK."

If you have any knowledge of the history and background of this type of forceps, please contact Dr. Ralph Crawford, Editor, Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6. ■



CDA RETIREMENT SAVINGS PLAN

✓ Check Out Superior Investment Performance

CDA Fund Performance (for periods ending August 30, 1996)[†]
(Checks indicate Superior Performance Compared to Industry Averages.*)

CDA Fund	1 Year		3 Year		5 Year		10 Year	
	CDA	Other*	CDA	Other*	CDA	Other*	CDA	Other*
Aggressive Equity	18.7%	26.2%	n/a		n/a		n/a	
Common Stock	5.2%	16.1%	5.9%	8.4%	9.0%	10.5%	✓ 8.3%	8.1%
Balanced	11.8%	12.2%	✓ 8.3%	7.5%	9.6%	9.9%	✓ 8.7%	8.2%
Bond & Mortgage	✓ 11.6%	9.7%	✓ 7.3%	5.9%	✓ 10.1%	9.3%	✓ 9.8%	9.2%
Money Market	✓ 5.7%	4.9%	✓ 5.6%	4.9%	✓ 5.9%	5.4%	✓ 8.0%	7.6%
International Equity	10.6%	10.7%	n/a		n/a		n/a	
European	✓ 17.5%	17.1%	n/a		n/a		n/a	
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years with the Canadian Armed Forces. In 1974, he moved to Vancouver, where he continued to practise until he retired in 1990.

Ladelfa, Dr. Paul: Dr. Ladelfa of Brampton, Ontario, graduated from the University of Toronto in 1982. He died in May 1996.

Martin, Dr. Donald A.: Dr. Martin of Cobble Hill, B.C., died July 25, 1996, at the age of 52 after a long illness. He graduated from the University of Alberta's faculty of dentistry in 1969, and practised in Duncan, B.C., for 24 years.

McCrary, Dr. Thomas P.: A 1959 graduate from McGill University's dental school, Dr. McCrary died June 21, 1996. For many years, he was the director of the dental clinic at the Montreal Children's Hospital.

McCullough, Dr. John K.: Dr. McCullough of Niagara Falls, Ontario, died March 29, 1996. He graduated from the University of Toronto's faculty of dentistry in 1951.

Nacht, Dr. Max: Dr. Nacht graduated from the University of Toronto's dental school in 1933. He joined the Canadian Army in 1940, and rose to the rank of major during a five-year tour of duty in Europe during the Second World War. In 1946, he became the first specialist in pediatric dentistry west of Montreal. He practised in Vancouver until he retired in 1995. During his career, Dr. Nacht served as president of the International College of Dentists and, for seven years, was the registrar of the College of Dental Surgeons of B.C. Dr. Nacht died August 7, 1996, at the age of 85.

Paige, Dr. Wilbur E.: Dr. Paige of Lennoxville, Quebec died April 26, 1996. He received his dental degree from McGill University in 1959.

Wood, Dr. Philip A.: Dr. Wood of Guelph, Ontario, died July 7, 1996. He graduated from the University of Toronto in 1968. ■

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ABSTRACT

Conventional composite resin restorations compared to direct inlays

The use of composite resin to directly fill restorations is a frequently performed procedure and is continuing to increase in popularity over amalgam. The problems associated with direct composite resin restorations include postoperative sensitivity, susceptibility to staining, uncured resin layers and marginal breakdown. In addition, significantly more time is required for the placement of composite resin restorations. Composite inlays were introduced to avoid these problems, yet still provide an esthetic restoration. This in vivo study compared the qualities of direct composite resin restorations with those of composite inlays and found there was little difference in clinical performance.

Composite resin was used to fabricate 100 pairs of restorations in 73 patients either by a direct layered fill

method or by the fabrication of a direct composite resin inlay. The material used was Coltene Brilliant Dentin which is a small particle hybrid. At three years after the placement of the restorations, 71 patients were available for follow-up. The restorations were evaluated for marginal integrity, marginal staining, surface roughness, color shift, interproximal contact, occlusal contact and gingival index.

The restorations showed no statistically significant difference with regard to the evaluation criteria. Of the restorations placed, there were a total of 12 failures, with twice as many direct composite inlays failing as conventional direct composite restorations. There were no cases of secondary decay in any of the restorations. Temperature sensitivity was reported by 30 per cent of patients with inlays, as opposed to 18 per

cent of patients with conventional composite restorations.

The placement of direct inlays required significantly more time than conventional composite resin restorations. There was little evidence of any advantage of direct inlays over conventional composite placement. It is possible some of the disadvantages of the direct inlay could be overcome by the use of an indirect technique in which the interproximal contact could be greatly improved over either conventional composite placement or direct inlays. At this time it would appear direct composite inlays have little to no advantage over conventional composite resin restorations. ■

Wassell R.W. et al. Br Dent J 179:343-349, 1995.

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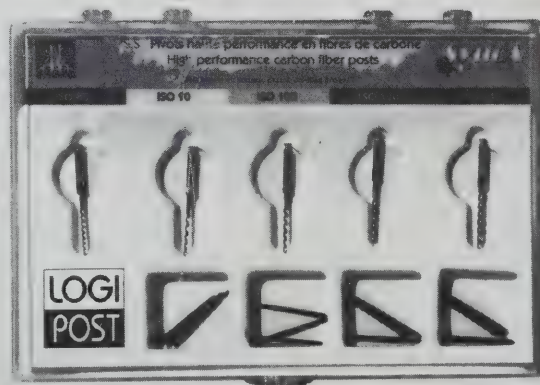
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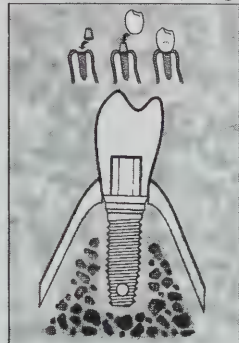
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IMPLANTS



A Clinical Trial Of a New Dental Implant

R.D. Listrom, DMD, M.Sc., DOSA

Deborah Smith, RN

J.M. Symington, BDS, M.Sc., PhD, FDSRCS

ABSTRACT

This paper presents the results of a clinical trial of a new dental implant after two years of loading. The design and the technical details of the surgical and prosthodontic phases of treatment are discussed. The implant's success was measured using Health Canada (Health Protection Branch) criteria. Patients with less than optimal clinical situations were not excluded from the study. The study shows survival rates in the lower jaw of 85.6 per cent and in the upper jaw of 86.7 per cent. Bleeding and oral hygiene indices and bone loss (less than 0.2 mm/yr) all fall within generally accepted limits.

SOMMAIRE

Dans cet article, on présente les résultats d'un essai clinique d'un nouvel implant dentaire après deux années de charge. On explique l'élaboration des étapes chirurgicales et prothodontique tout en donnant des précisions techniques. Les critères adoptés sont ceux de Santé Canada (Direction générale de la protection de la santé). Les critères de sélection n'excluent pas les patients dont l'état clinique est moins qu'optimal. L'étude révèle des taux de survie de 85,6 pour cent dans la mâchoire inférieure et de 86,7 pour cent dans la mâchoire supérieure. Les indices d'hémorragie et d'hygiène buccale ainsi que les pertes osseuses (moins de

0,2 mm par année) se situent tous à l'intérieur des limites générales admises.

Introduction

The first record of a successful dental implant appears to be of Mayan origin, dating from 600 A.D.¹ While transplantation of teeth has been attempted for several hundred years and was particularly popular during the last century, written records of alloplastic dental implants were sporadic. Maggiolo, in 1807, seems to have been the first to publish a report of an implant design, although Rogers, in 1840, found the results to be less than satisfactory.²

From 1870 to 1905, there was a series of anecdotal reports on implant use and implant design, the most significant of these being the silver capsule technique described by Payne.³ A variety of alloplastic materials ranging from porcelain to ivory have been reported in the literature. In 1910, Greenfield began a series of articles describing the design and use of a platinum-iridium dental implant, which was shaped in the form of a cylindrical cage.⁴ Although his reports are again anecdotal, together they formed a body of evidence which clearly indicated that long-term success could be achieved. Although Greenfield had prepared the way, only a few articles on dental implants can be found in the literature prior to the introduction of the subperiosteal implant by Goldberg and Gershkoff in 1948.⁵ This concept, with some modifications, is still in use today.

In 1955, Beder described the biological reaction to the implantation of titanium discs. This was followed two years later by the description and use of a dental implant.^{6,7} Although chrome-cobalt alloys were still used for the next decade (for both subperiosteal and blade implants), the use of titanium by Brånemark et al⁸ (Nobel Biocare (formerly Nobelpharma) AB, Göteborg, Sweden) in a cylindrical root analogue allowed for predictable success over the long term.

Many dental implants now available make use of commercially pure or extra-low interstitial titanium. Recently, there has been a trend towards coated implants, including plasma-sprayed, porous-coated and hydroxyapatite-coated varieties. It is clear from the literature that some of these coatings, if exposed to the mouth, result in a rapid loss of bone around the implant.^{9,10}

Rationale

The majority of current implants are cylindrical in shape, and fabricated from commercially-pure or extra-low interstitial titanium. There is now good evidence that a tapered implant will distribute the stress of function to the bone in a different manner than a cylindrical implant.¹¹ Titanium 6,4 alloy has been shown to allow osseointegration.¹² This material has a yield strength 2.5 times greater than pure titanium, and a greater resistance to fatigue, which minimizes component failures. This study was designed to evaluate the re-

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Fig. 1: The implant illustrating the taper and the thread design.

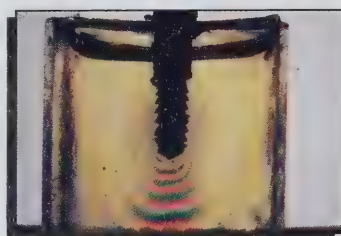


Fig. 2: A photoelastic study of a loaded implant demonstrating that the maximum stress adjacent to the implant is at the apex and not at the collar.

sults of a clinical trial of a tapered implant system fabricated from titanium 6,4 alloy, the same material used to manufacture the Ostial implant.

Materials and Methods

Implant Design

A 10.0 mm tapered screw implant with a coarse self-tapping thread was used (Fig. 1). The screw thread is angled at 60°, with the apical face of the thread at 90° to the long axis of the implant. A tapered design reduces the loading at the implant collar, although the load is increased at the apex¹¹ (Fig. 2). The thread geometry allows the greatest resistance to compressive forces, while the coarse thread of the implant is similar to a cancellous bone screw and achieves excellent primary stability without the need to engage cortical bone. Due to the limited success achieved with shorter implants, an implant length of 10.0 mm is preferred.

Flutes positioned in the apical third of the implant improve the performance of the fixture as a self-tapping device. When the flutes fill with bone, they also resist rotation. The mating surface of the

implant exhibits a peripheral rim which is compressed when the abutment is finally secured, minimizing the gap between the abutment and the implant. There is a slot across the implant surface, extending short of the peripheral rim, which accepts projections on the mating surface of the abutments, and enables reproducible orientation of the abutment. This slot also prevents rotation of the abutment when it is in place. The implant has a 2.0 mm hexagonal recess in the centre to accommodate the driving tool. This recess leads to the central threaded hole, which receives the connecting screws (Fig. 3).

The abutments join to the implant with central screws. All except the interim abutment have projections that fit into the groove on the mating surface of the implant to prevent rotation (Fig. 4).

The abutment for restoration of the edentulous jaw is shaped like a mushroom, and is intended for use with an overdenture and a flexible lining. The crown and bridge abutment is a cone with a 5° taper and a 0.5 mm collar. The restoration is meant to be fabricated and cemented to this abutment in a manner similar to a conventional post core and crown restoration. Usually, the crown is fabricated with a hole to allow access to the central screw for retrieval purposes (Fig. 4). Other attachments are available for cases that require custom-built abutments (i.e. where modification of the angulation of the abutment is desired).

Implant Placement

After having exposed the alveolar bone, a hole is drilled with a #6 round bur to accommodate the guide pin which aids in the proper alignment of the implant(s). The alignment should be parallel to the adjacent teeth or to the other implants. The Lindemann (Gebr. Brasseler GmbH & Co. KG, Lemgo, Germany) bur and the 2.5 mm twist drill are then used to enlarge the site. Shaping of the site is initiated with the tapered drill, without countersink, and is completed by using the tapered drill with countersink. The countersink creates a seat for the implant collar. If the bone is dense, the site is then tapped using an appropriate sized wrench to drive the 10.0 mm

tap. The implants are removed from the double layer sterile package and driven by hand into the prepared site using this same wrench. All steps in site preparation, including tapping, are carried out under saline irrigation to minimize the generation of heat. A cover screw is then placed and the incision is closed. The site is left to heal for at least four months.

Abutment Placement

Using a dental probe to locate the implants, the overlying tissue is removed with a tissue punch. Where necessary, exposure of the implant is achieved by an incision through the crest to leave a zone of attached gingiva adjacent to the abutment. The cover screw is removed and an interim abutment is attached to the implant. Edentulous abutments are placed, providing they can be accommodated in the existing denture.

Prosthetic Procedures

Overdenture Technique¹³

A custom tray is fabricated. The interim abutments are then replaced with edentulous abutments and a final impression is taken. A

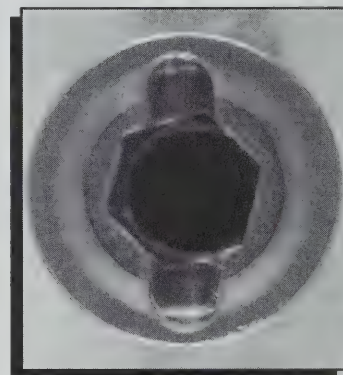


Fig. 3: The mating surface of the implant illustrating the slot and the central hexagonal recess giving access to the central screw threads.

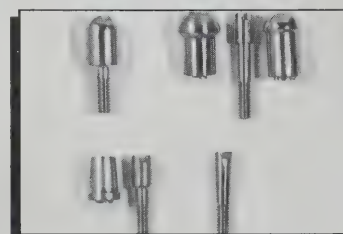


Fig. 4: The abutments with a projection on the base which fits the slot in the implant to prevent rotation.

rigid acrylic denture base is constructed, incorporating a cast chrome cobalt box with retention wires, in the area over the implants (**Fig. 5**). The bite registration, try-in and finish of the denture proceed in the usual way. Finally, the box over the implant(s) is filled with a vinyl polysiloxane impression material and the denture is seated in the mouth. The impression material is allowed to set, and the denture is removed from the mouth. Excess impression material is trimmed. The vinyl polysiloxane conforms to the abutment and, when it is set, provides excellent retention by engaging the undercut on the abutment. Other resilient materials are also used (such as permanent soft lining), according to the preference of the restorative dentist.

Single Tooth and Other Fixed Prostheses

The interim abutments are replaced with transfer abutments, and a vinyl polysiloxane impression is made in a custom tray. Implant analogues are screwed to the transfer abutments, which are then fitted into the impression. Alternatively once the impression plaster has been used to secure the transfer abutments in the impression, the transfer abutments are released from the implants in the mouth, and removed with the impression. The impression is then cast in stone, and the both impression tray and transfer coping(s) are removed, leaving the implant analogue(s) in the same spatial relationship as the implant(s) in the mouth.

The single tooth abutment is attached to the implant analogue, and the crown or bridge is fabricated in the same way as standard post and core preparations, but with a hole through the occlusal surface to allow access to the central screw. Once fabrication is complete, the single tooth abutment is attached to the implant, taking care to ensure that it is properly seated. The prosthesis is tried and adjusted to attain passive fit and proper occlusion. It is then cemented into place, and the access hole sealed.

Clinical Trial

Patient Selection

The patients enrolled in the study **Table I** were chosen from the general population. Patients with a less than favorable bone structure were not excluded from the study.

The inclusion criteria were as follows:

- 1) Male or female patients, 18 to 70 years of age;
- 2) Patients able to communicate accurately with the study personnel;
- 3) Patients able to understand the nature of the procedure, and sign an informed consent form;
- 4) Patients able to attend follow-up visits without undue difficulty.

Patients were excluded from the study on the basis of the following criteria:

- 1) Patients who, in the opinion of the investigator, were unable to comprehend the nature of the procedure;
- 2) Patients who may be pregnant;
- 3) Patients who suffer from intercurrent disease of such severity that the surgical or prosthodontic procedures may result in a deterioration of their health.

At the time of enrolment, all patients read the text and were provided with a verbal explanation of the risks and benefits of the procedure by the clinical investigator(s). They then signed a consent form approved by the Ethics Committees from the University of Toronto and the Toronto Hospital.

Clinical Assessment

The Ostial Dental Implant System was evaluated according to the Health and Welfare Canada (Health Protection Branch (HPB)) criteria for implant success.¹⁴ These criteria are:

- 1) Implant immobility;
- 2) No radiographic evidence of juxta-implant radiolucency;
- 3) Loss of bone height adjacent to the implant of less than 0.2 mm annually following the implant's first year of loaded service;

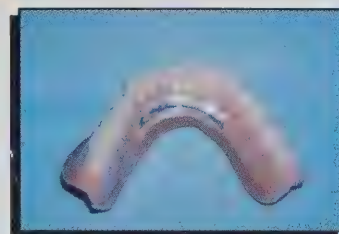


Fig. 5: A complete lower denture with the cast chrome cobalt box incorporated.

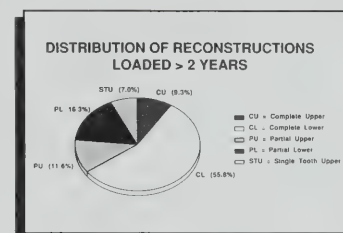


Fig. 6: Distribution of reconstructions loaded greater than two years.

- 4) A score no greater than 2.0 in the soft tissue in contact with the transmucosal components of the implant, using the conventional gingival index of Loe & Silness.¹⁵

With respect to the above criteria, the minimum standard set by HPB for implant success is an 85 per cent success rate at the end of two years of loaded service (all implant sites).

The above criteria were evaluated as follows:

- 1) Implant immobility was tested by applying lateral pressure to the implant and by percussion;
- 2) The presence or absence of juxta-implant radiolucency was identified using periapical films;
- 3) Bone loss was determined from examination of radiographs, using the known distance between the implant's threads as a correction factor for distortion;
- 4) Pocket depth was determined using a periodontal probe;
- 5) The bleeding and oral hygiene indices were scored using the criteria of Loe and Silness.¹⁵

Patient satisfaction was scored for the first 25 patients enrolled in the study, using a linear analogue scale. The patients estimated their condition before and after treatment by placing a hatch mark



across a horizontal line (visual analogue scale) for each time point.

Results

Forty patients were enrolled in the study, and a total of 173 implants were placed. However, prior to loading the implants, two of the patients terminated the study (one patient refused to continue and one moved) resulting in the loss of 10 placed implants from the study. A further three implants were lost prior to loading (one due to infection and two due to undetermined causes), leaving a total of 160 implants loaded ($n=116$ in lower jaw; $n=44$ in upper jaw) in 38 patients. The edentulous status of this patient group is presented in **Table I** and **Fig. 6**. Fifteen (12.5 per cent) and five (11 per cent) of the loaded implants were lost from the lower and upper jaw respectively within the first year of loading (**Table II**). Implant losses (23 in all) were attributed to infection in the tissues surrounding the implant (3), insufficient bone (1), and trauma (1). No cause was determined for the failure of the 18 other lost implants.

All mobile implants ($n=23$) were regarded as failures. There was no evidence of juxta-implant radiolucency in any implant radiographed at loading (time zero), six months, or at one or two years post-loading.

The average bone loss in the first year was $0.64 \text{ mm} \pm 0.74 \text{ mm}$. Between years one and two, it was $-0.27 \pm 0.78 \text{ mm}$ (i.e. there was an average increase of 0.27 mm . In 50 per cent of the cases, the bone height at year two was equal or greater to the measurement obtained at year one) (**Table III**).

The pocket depth measurements were not significantly different between the time of loading and two years post-loading (**Table IV**). Additionally, the bleeding and oral hygiene indices of Löe and Silness¹⁵ were well within the limit (a score of 2.0) set by the HPB guideline for the Clinical Evaluation of Endosseous Dental Implants¹⁴ (**Table V**).

An overall success rate (as defined in **Table II**) of 85.6 per cent and 86.7 per cent was achieved in the lower and upper jaw respectively. Twenty-four (96 per cent) of

Table I

Demographics of Study Participants With Implants Loaded Two Years Or More

Sex Distribution	
Male	14
Female	24
Age	
Range	28 to 72 years
Mean	54.03 years
Race	
Caucasian	36
Black	1
Oriental	1

Table II

Implants Loaded Two or More Years

Total Loaded	163
Total Lost	23
Percentage of Implants Lost	14.1%

Table III

Bone Loss*

At 12 Months	At 24 Months
$0.69 \pm 0.74 \text{ mm}$	$0.29 \pm 0.78 \text{ mm}$

* $n=66$ sites

Table IV

Pocket Depth*

At 12 Months	At 24 Months
$4.02 \pm 1.66 \text{ mm}$	$3.83 \pm 1.94 \text{ mm}$

Table V

Bleeding and Oral Hygiene Indices*

Bleeding Indices	
At 12 Months	At 24 Months
0.8 ± 0.84	0.29 ± 0.43
Oral Hygiene Indices	
At 12 Months	At 24 Months
0.41 ± 0.49	0.47 ± 0.5

* $n=148$ sites

the 25 patients surveyed for patient satisfaction at one year post-loading indicated that their satisfaction with the reconstruction had changed from the lowest quartile prior to treatment into the highest quartile after treatment. This result indicates that the probability (95 per cent confidence interval) of a patient perceiving an improvement in their condition using this implant system lies between 82 per cent and 100 per cent.

Discussion

The Ostial implant was easily placed in a variety of clinical situations. Its thread design allowed excellent primary stability in all types of bone. It was not necessary to engage cortical bone to achieve stability and integration of the implant. Therefore, an assortment of longer fixtures was not required.

All patients were selected according to the previously described criteria — not only those who had the best chances of success. For example, patients with less than favorable bone height (as may be encountered in the edentulous/partially edentulous general population) were not excluded from the study.

Implants were defined as being loaded once an abutment had been placed, since at that time chewing forces would be transmitted to the implant. One hundred sixty-three implants were placed and 160 were loaded (using the above definition of loading). The proportion of the total implants placed in the upper and lower jaws is consistent with the investigators' past experience in other edentulous/partially edentulous patients (i.e. 25:75).

An implant success rate of 85 per cent at the end of two years of loaded service is a minimum criterion for rating the efficacy of an implant system. The success rate in the upper jaw of 86.7 per cent and in the lower jaw of 85.6 per cent, and a combined success rate (all sites) of 85.9 per cent, meets this particular criterion. In relation to implant loss, the results of this clinical trial are almost identical to those recorded by the same investigators in a study of 1,027 Brånemark implants, performed with a similar protocol. The implant survival statistics for this study appear

to reflect the pattern of recruitment into the study. Selection criteria emphasized the need for implants or the patients' desires rather than an investigator's stringent criteria for success. This liberal approach, while almost certainly increasing the number of failures because of borderline anatomical suitability, was offset by a very careful explanation of the risks and benefits. A limited number of patients have now had this implant in place and loaded for more than five years. The number of implants lost after the first year is less than one per cent of the implants placed.

Smith and Zarb,¹⁶ and Zarb and Albrektsson,¹⁷ have discussed the criteria for the assessment of implant studies. They state that only losses pertaining to the implant should be considered, and that losses from other causes (infection, trauma, inadequate bone) should be reported, but not included, in the evaluation of the implant. If these criteria are applied to the Ostial Dental Implant System, then the overall success rate in our study would have been 89 per cent.

The HPB criterion for bone loss around the implant site is 0.2 mm annually, following the first year of loaded service. In order to make these measurements meaningful, consistent satisfactory radiographs must be available. While a device to hold the X-ray film may be screwed to the abutment in three-stage implants (i.e. Brånemark implants), this is not possible in the Ostial Dental Implant System. Such a technique would require removal of the abutments, which we considered unethical. It was therefore not possible to take radiographs suitable for measurement of all the implants placed, which accounts for the discrepancy between the number of sites analyzed radiographically and the total number of implants placed. The average value obtained in this study from bone loss measurements ($n=66$) at the end of two years of loaded service complies with the HPB criterion as the bone height measurements indicated an average increase in bone height of 0.2 ± 0.78 mm between the first and second years of loaded service. Rigorous statistical examination of the figures for bone loss using a paired t-test show, however,

that there was no significant difference in bone height between year one and year two.

Pocket depths can be related to the original depth of the mucosa overlying the implant, and to hypertrophy from local irritation. Careful records were kept of pocket depths. Bleeding and oral hygiene indices were recorded using the method of Löe and Silness.¹⁵ The trial results clearly indicated that all these parameters were well within the specified limits. Where thorough oral hygiene was maintained, there was no blood on probing and pocket depth was no greater than the thickness of the mucosa adjacent to the abutments. In situations where soft tissue thickness interfered with adequate hygiene, the health of the adjacent soft tissue was improved with surgical reduction. A suitable soft tissue/implant relationship can usually be established at the abutment placement, and is optimized by maintaining a zone of attachment in the soft tissue adjacent to the abutment.

Although this clinical trial was designed to show very specific tissue responses to the placement of the Ostial Dental Implant, patient response to the treatment is of prime importance. The patients' evaluations of the improvements in their oral function and esthetics showed a very high level of satisfaction. The single patient who was not satisfied with her appearance had the prosthesis replaced and was very pleased.

Conclusion

The conclusions which may be made from the results of the clinical trial are:

- 1) The implant shows an overall success rate of 85.9 per cent (lower jaw 85.6 per cent, upper jaw 86.7 per cent) two years after loading.
- 2) The bone loss in the first year was $0.64 \text{ mm} \pm 0.74 \text{ mm}$, and no loss was detected between year one and year two.
- 3) Pocket depths, bleeding and oral hygiene indices are all within the limits set by Health Canada (Health Protection Branch) in defining implant success.

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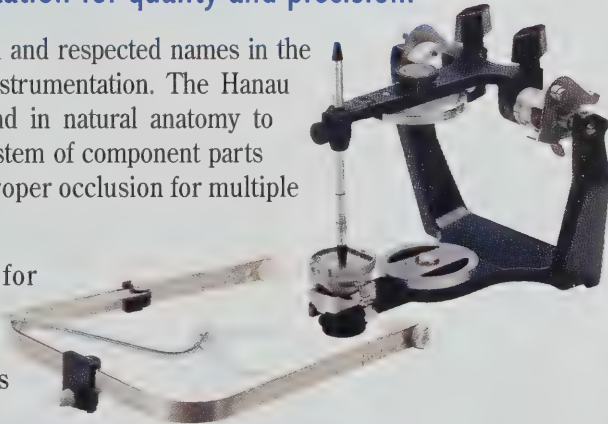


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- 4) Patient satisfaction was very high, with the probability of the patient perceiving improvement lying between 82 per cent and 100 per cent. ■

Acknowledgements: This study was supported by the Government of Ontario through the University Research Incentive Fund, Project T010-008, and by Knowell Therapeutic Technologies Inc.

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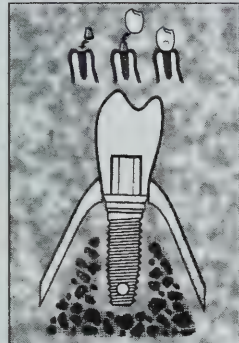
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IMPLANTS



Indications for Small Diameter Screw-Type Implants

C.G. Ibbott, DMD, FRCD (C)

R. Kovach, DMD

L.D. Carlson-Mann, SDT, RDH

Long-term success with screw-type osseointegrated implants has been well documented in the dental literature.¹⁻⁴ Screw-type implants have been generally available in the 3.75- to 4.0-millimetre widths. These widths are limiting because they are too wide for some ridge areas. For patients with narrow alveolar ridges, the clinician can either surgically increase the dimension of the ridge, through ridge expansion^{18,19} or by guided tissue regeneration (with or without bone grafts),^{9,17} or utilize a smaller diameter implant. In cases where tissue dimension is satisfactory and where soft tissue esthetics are adequate, it is preferable to use a small diameter implant than to resort to a more complicated procedure.

It has been suggested that a minimum of 1.0 mm of bone must be present on the buccal-lingual surfaces of implants after placement to achieve and maintain integration.⁵ Other controlling influences on implant diameter are the amount of space available for the final restoration, and the dimension of the replacement crown as it emerges from the soft tissue. The average diameter of the mandibular lateral incisor is 3.5 mm. The use of standard diameter implants (3.75 to 4.0 mm) can result in distorted prosthetics,

since standard abutments are in the 4.5 to 4.8 mm range. In these situations, an implant with a smaller diameter at the cervical margin is required, especially for mandibular incisors and sometimes for maxillary laterals. In general, small diameter implants are appropriate in areas of narrow ridge dimension or where prosthetic space is limited.

Pure titanium implants have been constructed with a diameter of 3.0 mm by Nobel Biocare U.S.A. (Nobel Biocare AB, Box 5190, S-402 26 Goteburg, Sweden). The clinically relevant strength value for a dental implant is the fatigue limit.⁸ Using a 3.75 mm implant as a reference, Nobel Biocare estimated that a 3.0 mm implant has only 45 per cent of the strength of a 3.75 mm implant. Although the 3.0 mm Nobel Biocare implant has been used with some success, its lack of strength is a limiting factor. Nobel Biocare has since discontinued its 3.0 mm implant.

Another solution has been the 2.9 mm diameter Miniplant by 3i Implant Innovations Inc. (3071 Continental Dr., West Palm Beach, Fla., 33407, U.S.A.). This implant is a self-tapping fixture with a hexagonal configuration at the superior aspect, which is critical to the stabilization of the final restoration. The use of a titanium alloy

provides the strength necessary in these small diameters (T86A1 4V).⁷ There is some experimental evidence that titanium alloy may result in a less favorable reaction in osseointegration (more irregular and disturbed bone formation) as compared to pure titanium,⁹ but clinical data does not reflect this finding. Because of the low strength of the 3.0 mm titanium fixture, the U.S. Food and Drug Administration (FDA) now requires implant diameters to be at least 3.25 mm. The 3i 2.9 mm alloy implant has recently been discontinued.

The latest evolution of the small diameter implant relies on a pure titanium fixture, but because the outer diameter has been increased from 3.25 to 3.3 mm, the strength approximates 80 per cent of the 3.7 mm fixture.⁸ A 3.25 mm Miniplant of commercially pure titanium has been introduced by 3i that has 90 per cent of the fatigue strength of the 3i 3.75 mm implant. This Miniplant is available with a standard prosthetic top of external hexagonal design. A version of the 3.25 mm Miniplant is made with a smaller prosthetic top, also of external hexagonal design, called the MicroMiniplant. The MicroMiniplant has a 3.4 mm diameter seating-surface. This implant may be the best choice for mandibular incisors and for some

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Fig. 1: Ridge which will accept a standard 3.75 mm implant.

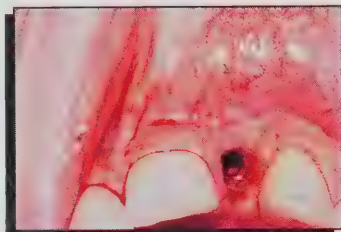


Fig. 5: Photo illustrating soft tissue dimension required for papillae MicroMiniplant.

maxillary lateral single tooth restorations. All prosthetic options, including the University of California, Los Angeles (UCLA)-type restoration, EP (Conical) abutment and the two-piece abutment post, are available. The MicroMiniplant allows small crowns in limited prosthetic spaces. Nobel Biocare is planning to introduce a 3.3 mm implant, while LIFECORE Biomedical (3515 Lyman Blvd., Chaska, Minn., 55318) presently has a 3.3 mm implant.

Based on the fact that many edentulous ridges are too narrow for the standard 3.75 mm diameter implant, and the fact that in some restorative situations the abutments that fit on these implants are too wide, there is a definite need for smaller diameter implants. In addition, the smaller diameter implant should have a hexagonal configuration at the coronal aspect (internal or external) to allow single tooth restorations to be placed in a stable manner without affecting the adjacent teeth. The hexagonal design also allows custom laboratory-constructed posts to be used to correct implant inclination for more ideal prosthetic results. The hexagonal design is important for angle correction, so that the angle-correcting abutment or post goes back to exactly the same lo-

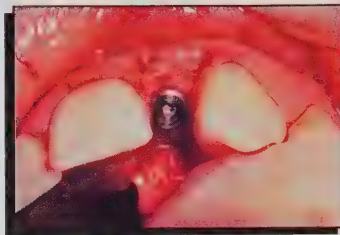


Fig. 2: Ridge that requires an implant with a diameter smaller than 3.75 mm.

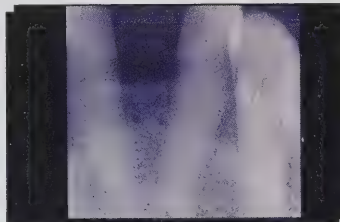


Fig. 6: Converging roots with little room for implant placement.

cation during seating as it did during the trying-in procedure. The retaining screw can then be placed with adequate torque.

Small diameter implants have a reduced amount of implant surface within the bone when compared to the standard 3.75 mm diameter implant. With any small diameter implant, placing additional implants to increase the square millimetres of implant in contact with the foundation bone supporting a fixed restoration would be advantageous.

If conventional diameter implants are placed where there is minimal interdental space, it may cause crowding of the interproximal papilla areas adjacent to the implant restoration. This can be caused by both the 3.75 mm implant, which is actually 4.0 mm at the coronal aspect, as well as by the second stage abutment, which is 4.5 mm (standard abutment). The large size of the implant and the second stage abutment cause over-sizing of the crown for the particular location and strangulation of the interproximal papilla.

Conclusion

The small diameter implant is an important tool in the armamentarium of the implant practitioner. Its use is key to total patient management when narrow residual



Fig. 3: Radiograph illustrating adequate room for a 3.75 mm implant.



Fig. 4: Radiograph illustrating placement of a MicroMiniplant in an area of restricted bone width.

ridges and limited space for crown construction are being considered. The anti-rotational coronal hexagonal configuration provides a stable base for single-tooth or custom-post constructions.

When using small diameter implants to support fixed bridges, more implants should be considered to increase the square millimetres of bone-implant interface supporting occlusal function.

Further research is required to determine the amount of support needed when using implants of various dimensions. ■

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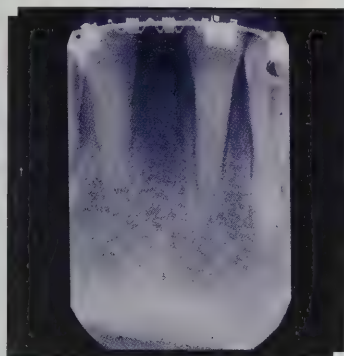


Fig. 7: Same case as Fig. 6 after orthodontics to align roots and provide



Fig. 8: Augmentation of ridge with bone graft.



Fig. 9: Missing tooth space with implant replacement.



Fig. 10: Restored Fig. 9 case.



Fig. 11: Case showing two custom posts using gold UCLA abutments (3i, West Palm Beach, Fla.) for lateral incisor implants.



Fig. 12: Completed crowns.

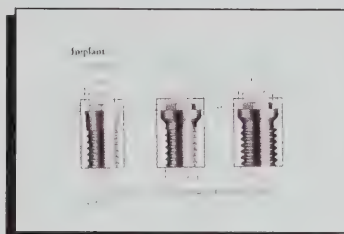


Fig. 13: Implant dimensions.

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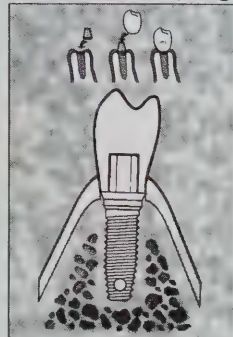
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IMPLANTS



Guided Bone Regeneration To Facilitate Implant and Prosthodontic Therapy: Three Case Reports

(La régénération osseuse guidée pour faciliter l'implant et la thérapie prosthodontique: trois rapports de cas)

Todd Jones, DMD, Dip. Perio.

Helen Scott, B.Sc., DDS, M.Sc., Dip. Perio., MRCD(C)

Henry Louie, DMD, Dip. Perio.

SOMMAIRE

Chez certains patients, le manque d'os à un site de fixation désirée entraînerait nécessairement la pose d'implants intra-osseux à des endroits moins que favorables. Or les principes de la régénération osseuse guidée peuvent servir à restaurer les pertes de l'os alvéolaire et permettre la pose d'implants à des endroits meilleurs, ou fournir une crête plus favorable pour supporter une prothèse amovible. Dans cet article, on explique les avantages d'une technique en deux volets comprenant une greffe osseuse suivie d'une période de guérison avant la pose de l'implant. Trois rapports de cas illustrent différentes méthodes pour mécher la membrane afin d'aménager de l'espace pour la croissance osseuse. La tomographie informatisée démontre qu'il y a effectivement augmentation de l'os.

ABSTRACT

In some patients, lack of bone at a desired fixture site has resulted, by necessity, in the placement of endosseous implants in less than favorable locations. The principles of guided bone regeneration can be used to restore lost alveolar bone and permit the

placement of implants at more ideal locations, or to provide a more favorable ridge form to support a removable prosthesis. The advantages of a two-stage technique involving bone grafting followed by a healing period prior to implant placement are discussed. Different methods of membrane tenting to provide space for bone growth are illustrated by three case reports. Evidence of bone augmentation is provided by computed tomography.

Introduction

Many implants are placed in less than desirable locations because of inadequate bone at the ideal site. The restorative dentist or prosthodontist must then compromise esthetic or mechanical principles, and sometimes both, to achieve an acceptable result. Sometimes these compromises result in failure.

One approach has been to place the implant in the ideal location, despite the lack of bone, and concomitantly use guided bone regeneration (GBR) techniques to regenerate bone over the exposed threads of the fixture.¹⁻⁶ This approach has produced many successful cases, but in some instances the dehiscence exposes enough of the implant to compro-

mise its stability, putting the implant at risk for failure. Furthermore, any complications with the GBR technique may result in loss of the implant or reduced bone regeneration.⁷ An alternative approach is to use the GBR technique to regenerate lost bone prior to placement of the implant.⁸⁻¹¹ This approach has the disadvantage of requiring an additional surgical procedure and healing period. However, the implant can more frequently be placed in an ideal position, allowing for more predictable and successful prosthodontic therapy.

Ideally, the implant fixture should not have any exposed threads and should be stable in the desired arch position.⁸ If bone regeneration is only partially successful, and some threads are exposed, the use of GBR to encourage bone growth is still an option at the time of implant placement. The size of the dehiscence is generally smaller in this situation as a result of the bone augmentation.

The amount of bone regeneration achieved depends on the establishment and maintenance of a space beneath an occlusive membrane. Membrane collapse will limit bone regeneration. The clinician must decide if the defect morphology or functional load result-

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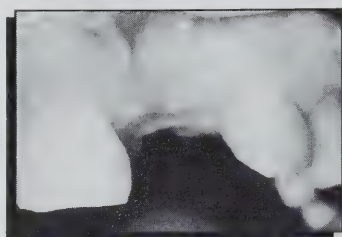


Fig. 1: Case 1: Pre-surgical photograph of missing #21.

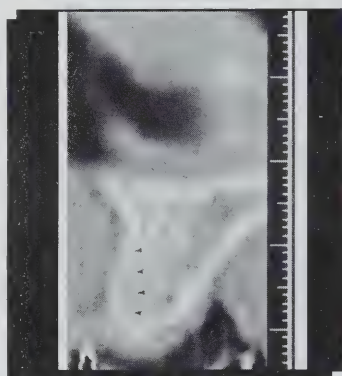


Fig. 2: Computed tomography shows new bone resulting from guided bone regeneration. Arrows show the original cortical plate.

ing from the defect location will lead to membrane collapse and space loss.

The principles of GBR can also be used to increase the support available for removable prostheses. However, little evidence is available to predict the long-term stability of newly-generated bone under such a functional load.

When the defect morphology or functional demands make collapse of the membrane likely, several methods of "tenting" the membrane to create space for bone regeneration are available. These include:

- 1) The use of bone allograft or bone autograft to tent up a membrane;¹²⁻¹⁶
- 2) The use of pins to tent a membrane with or without graft material;¹⁷⁻¹⁹
- 3) The use of titanium reinforced membranes;²⁰
- 4) The use of cast gold frameworks to tent membranes;²¹ and,

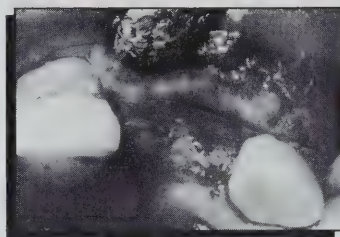


Fig. 3: Surgical photograph showing alveolar ridge immediately prior to implant placement.

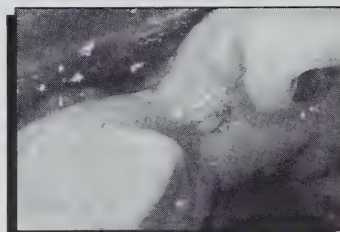


Fig. 4: Case 2: Pre-surgical photo of missing #12.

- 5) The use of N-butyl-cyanoacrylate to reinforce and tent membranes.²²

This paper will use three case reports to outline the principles of guided bone regeneration by tenting.

Case Reports

Case 1

A 36-year-old female lost tooth #21 due to a motor vehicle accident. The loss of the buccal plate of bone resulted in a buccolingual defect. To improve the esthetics and to gain bone for ideal fixture placement, a ridge augmentation procedure was performed. An Oval 6 Goretex membrane was tented using demineralized freeze-dried bone allograft (DFDBA) to provide space for new bone. The membrane was removed 10 months later (Figs. 1, 2, and 3).

A computed tomography (CT) scan was taken 10 months after bone augmentation to determine the length and the width of bone available for the implant. The outline of the original cortical plate is visible beneath the newly regenerated bone (Fig. 2). A single 3.75 x 15.0 mm Brånemark implant was placed to restore #21.

Case 2

A 26-year-old male lost teeth #12, #42, #43, and #44 due to trauma. Initially, the teeth were re-

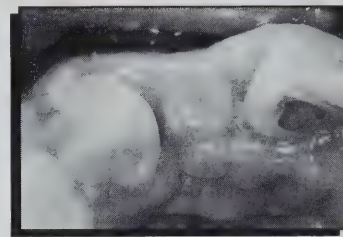


Fig. 5: Improvement in buccolingual dimension is apparent nine months after guided bone regeneration and immediately prior to implant placement.

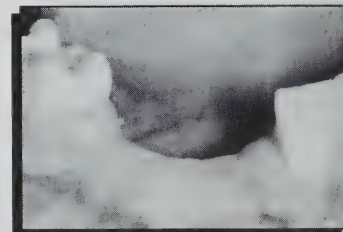


Fig. 6: Case 2: Pre-surgical photo of missing #42, #43 and #44.

placed with acrylic transitional partial dentures. Orthodontic positioning of the remaining teeth was completed prior to bone augmentation. A wax-up of the anticipated prosthodontic restoration was made. A CT scan was taken prior to bone augmentation to determine the anatomically important landmarks and the feasibility of implant placement without bone augmentation. The CT scan revealed that the mandible was only 3.5 mm wide at the narrowest point of the site of #42.

The maxillary defect was narrow and deep (Fig. 4). An Oval 6 Goretex membrane was tented by DFDBA. Guided bone regeneration provided increased buccolingual width (Fig. 5). The mandibular defect was longer and wider than its counterpart in the maxilla; and tenting could not be adequately provided by graft material alone (Figs. 6 and 7). Two Memfix pins were placed to hold the membrane away from the bone, and DFDBA was used to help tent the membrane (Fig. 8).

Acrylic surgical stents were fabricated from a diagnostic wax-up to aid in the placement of the implants. The healing period was uneventful, and the membranes were removed at the time of implant fixture placement. Ten months after augmentation of the mandible, two 3.75 x 15.0 mm Brånemark



Fig. 7: Full thickness flap showing broad-based concavities in the mandible.

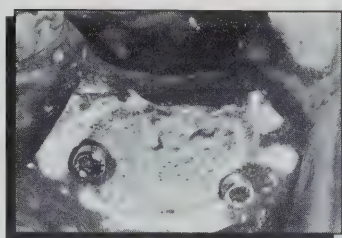


Fig. 8: A Goretex membrane is tented by two Memflex pins and decalcified freeze-dried bone allograft.

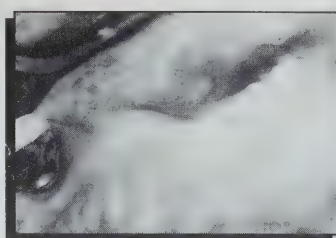


Fig. 9: Case 3: Pre-surgical photo shows buccolingual defect of partially edentulous quadrant. Patient had difficulty wearing partial denture.

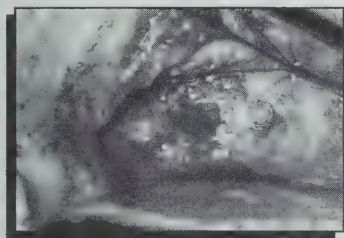


Fig. 10: Photo shows new bone formation four months after GBR. The head of the Memflex pin is just visible, indicating a 3.5 mm space has been filled.

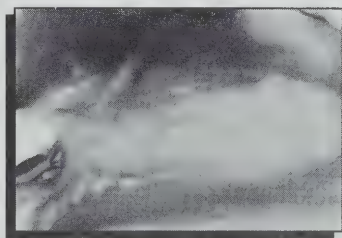


Fig. 11: Postoperative photograph immediately prior to fabrication of partial denture.

fixtures were placed. Nine months after augmentation of the maxilla, a single 3.75 x 18.0 mm Brånemark fixture was placed.

Case 3

A 48-year-old female was partially edentulous for 15 years. She had a large defect in the maxillary left quadrant due to a loss of cortical bone during the extraction of #26 (**Fig. 9**). Previous partial dentures were unsatisfactory because of continuous sore spots at the periphery of the defect, and on the exostoses posterior to the defect. Efforts to relieve the high spots on the prosthesis were unsatisfactory. To provide a more uniform arch contour, the exostoses were surgically removed and the defect was repaired by guided bone regeneration. An Oval 6 Goretex membrane was tented by a single Memflex pin and DFDBA. Four months after the augmentation procedure, the membrane was removed. Improvement in the arch contour could be observed.

At the initial surgery, the pin extended 3.5 mm from the base of the defect in a buccal direction. At the time of membrane removal, new hard tissue was present to the edge of the pin indicating 3.5 mm of new bone-fill in the buccolingual

direction (**Fig. 10**). Approximately 3.0 to 4.0 mm of bone-fill was also seen in the apico-coronal direction (**Fig. 11**). A new partial denture was made six months after the GBR surgery. The new partial denture has proven to be satisfactory to the patient and no further difficulties have been noted.

Discussion

The goal of guided bone regeneration is to increase the amount of existing bone to allow for the fabrication of a prosthesis that restores function and is esthetically acceptable to the patient. Achieving an esthetic result in a partially edentulous patient can be demanding, and requires the placement of fixtures in the ideal location for prosthodontic therapy.^{23,24} Historically, where trauma or resorption resulted in bone loss, ideal fixture placement was impossible. Successful bone regeneration is now possible through various augmentation techniques.

Currently, some debate exists regarding the effectiveness of placing graft material under a barrier membrane to promote bone augmentation. If the membrane can be successfully tented, and this space maintained, an allograft or autograft is not required for suc-

cessful bone regeneration. However, the graft material will aid in space maintenance. Bowers et al have demonstrated the inductive potential of an osseous coagulum and demineralized freeze-dried bone allograft.²⁵ Autogenous iliac bone has also been reported to be inductive.²⁶ For these reasons, the use of an allograft or autograft is recommended.

Shanaman, in a retrospective study of 237 implants treated with Goretex membranes and allografts, recommended using freeze-dried bone allograft (FDBA) because it resorbed more slowly than DFDBA, thus maintaining space longer.²⁷ A recent study compared autogenous bone chips to two types of DFDBA.²⁸ The graft material was placed over implant fixtures in modified cover screws called harvest cover screws (HCS). Autogenous bone chips were found to provide better quality and quantity of bone compared to DFDBA. Thus, some evidence is available that suggests autogenous bone is the best graft material. Most clinicians prefer to use autogenous bone, but its limited availability dictates consideration of other materials. Some studies have reported similar results for autogenous bone grafts and DFDBA.^{13,14}

Cortical penetration to the endosteal spaces is used by many clinicians to enhance blood flow into the space provided under the tented membrane.^{5,8,17,22} This may aid in the development of a stable blood clot. At the present time, however, no study has conclusively shown this to be a step necessary for success.

Reports by Yukna²⁹ and Kenney et al³⁰ suggest that synthetic grafts are as efficacious as DFDBA in promoting bone regeneration.



Table 1:

Treatment of Early Membrane Exposure

- 1) 0.12 per cent Chlorhexidine rinse twice daily.
- 2) Weekly examination and debridement of the exposed area.
- 3) Tetracycline 250 mg QID is prescribed for two weeks after exposure.
- 4) After eight weeks of healing, carefully remove the membrane, and leave the granulation tissue undisturbed.
- 5) The membrane must be removed if infection develops.

Some questions remain as to the time required for complete resorption of these alloplasts to occur. How the osseointegration of an implant is affected by close proximity of non-vital ceramic graft material is unknown. Therefore, placing an implant into alloplastic graft sites is not recommended.

Non-resorbable membranes are exposed in up to one-third of cases.^{11,27,31,32} If exposure occurs, chemical plaque control with 0.12 per cent chlorhexidine and weekly examinations and debridement can usually maintain the graft site until eight weeks of healing are achieved. The membrane can then be removed, leaving the underlying granulation tissue undisturbed (Table 1). If inflammation is controlled, the results of early membrane exposure may be negligible.

Early exposure may hasten the breakdown of resorbable membranes. If a resorbable membrane is used, it may be very difficult to remove should retrieval become necessary. Furthermore, resorbable membranes lose their stiffness very quickly, limiting their effectiveness for space maintenance.³² Therefore, resorbable membranes are not recommended for guided bone regeneration.

Additional methods of tenting include the use of cast frameworks.²⁰ These can be successful, but require custom-made frameworks, which increase the cost of the procedure. The Gore company has produced a titanium reinforced membrane designed for space-making.^{21,33} Sigurdsson et al have demonstrated supraalveolar bone regeneration using these membranes in dogs.³³ Recently, Echeverria et al demonstrated successful bone augmentation using Cortrex membranes reinforced by painting the external surface with N-

butyl-cyanoacrylate.²² Currently, human studies are being evaluated and publications are expected in the near future.

In **Case 1**, and the maxillary site of **Case 2**, the defect sites allowed for tenting by DFDBA alone. In the mandibular sites of **Cases 2** and **3**, the functional load and elasticity of the tissues would have placed excessive pressure on the membranes. It was necessary to place pins to ensure successful space maintenance. Over the course of the healing period prior to implant placement, some shrinkage and space loss was observed around the pins. Without these pins, the space loss may have resulted in limited bone formation.

After 10, nine, and four months respectively, the newly regenerated bone in **Cases 1**, **2** and **3** was very soft. However, none of the cases required self-tapping fixtures to achieve primary stability. The healing time required for adequate bone regeneration is unknown and is probably site- and patient-specific. A minimum time of six months is recommended by Buser.³⁴ More controlled studies are required to determine a less arbitrary guideline for optimal healing prior to fixture placement.

In **Case 1**, computed tomography was used to ascertain the maximal dimensions of available bone for fixture placement. The original cortex is visible beneath newly regenerated bone and a new cortical plate, providing evidence of new hard tissue formation (Fig. 2). In **Case 2**, a CT scan was taken prior to bone augmentation to assess the viability of proceeding with treatment. Although many new imaging techniques are available, computed tomography remains the most accurate method to assess bone dimensions and the

location of important anatomical structures.^{35,36}

From various studies and case reports, the principles of guided bone regeneration are emerging:

- 1) The membrane must be well adapted to isolate the defect for selective compartmentalized healing in order to regenerate bone.
- 2) The membrane must not be in contact with the sulcus of adjacent teeth, to avoid early exposure or recession.
- 3) Cortical penetration causing bleeding may aid stable clot formation.
- 4) Primary closure, although not absolutely required, is a goal of therapy. Early exposure of the membrane has been associated with reduced bone regeneration.
- 5) Resorbable membranes must not be used because they lose stiffness too quickly and can be difficult to remove if retrieval becomes necessary.
- 6) If early exposure of a non-resorbable membrane occurs, plaque control efforts must be undertaken to keep the membrane in place until eight weeks of healing has occurred.
- 7) The membrane must be removed if infection is present.
- 8) Space maintenance under a membrane is required for bone regeneration. Selection of an appropriate method is indicated by the size and shape of the bone defect.
- 9) If a large defect is present, or if prosthodontic requirements demand ideal implant position, bone grafting prior to implant placement is recommended to ensure adequate bone.
- 10) Following guided bone regeneration, a healing period of six to nine months should precede implant placement or definitive prosthodontic therapy.

Conclusion

The most desirable implant and prosthodontic therapy may not be possible or may be unduly compromised because of inadequate bone volume. Guided bone regen-

eration is a promising technique that can provide additional bone and improve the feasibility of implant and prosthodontic therapy. Space maintenance by membrane tenting is required for successful bone regeneration and may be achieved by using autograft, allograft, pins, frameworks, or reinforced membranes. Guided bone regeneration prior to implant placement can improve the quantity of bone and allow ideal implant placement with less chance of compromised stability. ■

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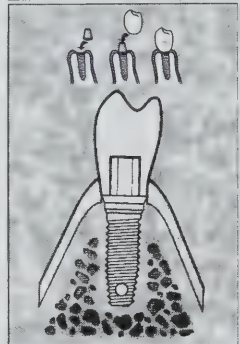
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IMPLANTS



Pre-Treatment Evaluation and Diagnosis For the Maxillary Anterior Single Implant Restoration

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Placing a single, maxillary anterior implant is a considerable challenge for the implant team. Recent reports show that the single endosseous osseointegrated implant is a viable clinical procedure, provided proper diagnostic and treatment protocols are followed.^{1,2}

As esthetics are of paramount importance to the patient, they should also be the primary focus of the implant team. Techniques to assist the restorative dentist in developing a rational, logical approach to planning and placing a single implant crown restoration are considered in this article.

Several factors must be assessed prior to the placement of a single tooth implant in the pre-maxilla. For example, the osseous support base is often inadequate in width and angulation; the facial cortical plate is typically very thin and porous; and the angulation produces force vectors that fall outside the implant body.³ All of these factors pose difficulties for the clinician.

Ideally, implants should be located so that the occlusal forces are along the long axis of the implants.⁴ This is virtually impossible in the pre-maxilla. If the tooth to be replaced was lost as a result of periodontal disease or trauma, there may be even less osseous support available than usual. After

tooth loss, the labial plate resorbs during initial bone remodelling. Similarly, the anterior ridge loses 40 to 60 per cent of its width, and remodels to a more palatal position within a year after tooth loss.⁵

Other important factors to consider in the evaluation and selection of patients for implant therapy include the length of time required for treatment; the cost of therapy; and the viable restorative and prosthetic options. The patient's age should also be considered, since implant therapy is contraindicated until after growth and development is complete.⁶ It is also important to determine the predictability of the esthetic result, by taking into account soft and hard tissue morphology. Implant therapy should allow existing teeth, bone, periodontal tissues and other oral structures to be preserved.

Initial Examination

Implant therapy requires a team-oriented approach, and must begin with a thorough patient evaluation. In the initial assessment, the restorative dentist should determine the patient's chief complaint, as well as taking his or her medical and dental histories. In addition, esthetics, occlusal relationships, gingival tissue, health and morphology,

edentulous ridge relationships, the presence of natural teeth, interocclusal space relationships and the general status of the remaining dentition should all be evaluated at this time.

A patient's smile line will affect the esthetic result of implant therapy. The restorative dentist should ask the patient to smile broadly, and note whether the smile line exposes only a portion of the maxillary teeth adjacent to the edentulous space; the entire length of the teeth adjacent to the space; or the teeth and the gingival tissues. There should also be adequate inter-occlusal space, so that the final restoration will inhabit the edentulous space without causing an esthetic compromise.

The occlusal forces on the final restoration should be as light as possible, and those on the teeth adjacent to the future implant should be well established. Positive occlusal contacts on firm, non-mobile teeth are needed. Lateral and protrusive guidance should also be evaluated, as the eccentric occlusal load should be borne by the adjacent natural teeth. Any evidence of parafunction should be noted, and may be a contraindication to implant therapy.

There should be an adequate zone of attached gingiva on the



Fig. 1: Area around #21 after osseous graft has been placed.



Fig. 2: Area around #21 following the extraction, after healing but before osseous graft.



Fig. 3: Final implant retained crown: note the neck of #21 crown is slightly palatal to the CEJ of #11 (Sterioss Implant System).



Fig. 4: Note how lip line can sometimes cover deficiencies in final implant location.



Fig. 5: Implant placement is too far superior on the ridge (Dentsply Spectra System).



Fig. 6: Implant retained crown with gingiva colored porcelain. It is critical that the demarcation line between tooth colored and gingiva colored porcelain is

implant site. The health of the soft tissue, including the interdental papilla, should be determined, because it may influence the surgical technique. Periodontal probing of the adjacent teeth should be performed and charted.

The bone width and height of the edentulous ridge should be evaluated. In all cases, the minimum buccal-lingual width of osseous tissue required for the long-term survival of root-form implants is 5.0 mm.⁷ The edentulous ridge should be evaluated in all three dimensions to determine: the loss of vertical ridge height; the extent of horizontal ridge loss; and the presence of defects or deficiencies in ridge width. If tomograms are not available, ridge mapping, using a local anesthetic, may be used for this purpose.

In cases where the ridge is deficient, every effort should be made to augment it. Osseous grafting can be used to build up vertical deficiencies, but not as predictably and consistently as it can with width (buccal-lingual) deficiencies. If a single implant is placed in a site with osseous deficiencies, the prosthetic phase of treatment will be compromised, as the implant will likely have to be situated apically to the cemento-enamel junction (CEJ) of the adjacent

tooth, and/or more palatal to it. In these situations, the restorative dentist must discuss the esthetic compromises with the patient prior to the implant surgery. All of the other parameters of implant placement must be adhered to when dealing with a deficient ridge.

The natural teeth adjacent to the edentulous site should not be mobile. Ideally, they should have either no restorations or only small intact restorations. They should also be free of periodontal disease and pulpal pathologies. The presence of diastemata in the segment to be restored may contraindicate a fixed partial denture, making an implant-supported crown the restoration of choice. If each of the adjacent teeth requires major restorations or crowns, then a fixed partial denture may be preferable. It is also important to note the position of the mandibular tooth opposing the edentulous site, to ensure that there is adequate room for the final restoration.

It is essential to determine the space relationships that will influence the design of the final restoration. Both the mesial-distal width of the edentulous site and the width of the matching natural tooth on the contralateral side of the dental midline should be

measured, and the two measurements compared for compatibility. There should be approximately 2.0 mm between an implant and a natural tooth or an adjacent landmark.⁸ If the narrowest diameter implant is approximately 3.0 mm, then the edentulous site should not be much less than 7.0 mm wide. Equally important, if periapical radiographs show that the roots of the teeth adjacent to the edentulous space are converging, the bone width available for implant placement may be severely limited and orthodontic intervention may be necessary. The general status of the remaining dentition should also be checked to confirm the absence of complications in the plane of occlusion and the stability of inter-arch relationships.

Consultation After the Initial Examination

Following the visual dental examination, it is appropriate to discuss a number of issues with the patient, including the advantages and disadvantages of the various treatment alternatives. These include: no treatment; a fixed partial denture; a resin-bonded bridge; or a removable partial denture.

Diagnostic study casts preferably mounted on a semi-adjustable articulator should be made in



Fig. 7: Full smile from patient in Figs 5 and 6.

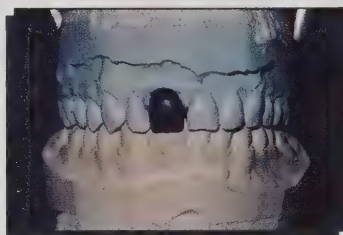


Fig. 8: Wax-up of #21. Note that the neck of the tooth is in line with #11.

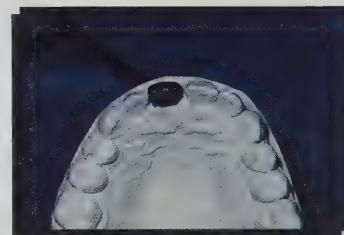


Fig. 9: Wax-up of #21. Note that the incisal edge is in line with #11.



Fig. 10: The implant placement for screw-retained crowns is usually palatal, so that the angle of exit of the screw is through the gingulum.

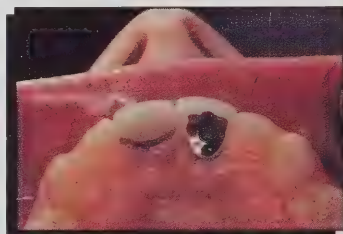


Fig. 11: Lingual view of a screw-retained crown. The resin plug for the screw access hole has not been placed yet.



Fig. 12: The implant abutment (Dentsply Spectra System) is located in the area of #23.



Fig. 13: Lateral view of finished crown (implant-retained crown at #23).

advance and used during the consultation appointment.

In cases where the patient will be expected to wear a provisional restoration, he or she should be informed about what this will entail. Depending on the treatment alternative selected, there may be no need for a provisional restoration, but either a removable partial (acrylic base) denture or a provisional resin-bonded bridge may be required. The patient should also be informed about the length of time he or she may be without a provisional restoration following each surgical procedure.

It is important to discuss the success rates of single tooth implants with the patient, and to note his or her reaction to the possibility of failure. The patient's attitude and general demeanor during this discussion will provide important clues to the types of patient man-

agement problems that may arise in the future.

All prosthetic fees associated with the treatment should also be discussed with the patient. If possible, a range of surgical fees should be presented, so that the patient has an idea of the total cost of the proposed treatment.

If the patient is interested in pursuing implant therapy, a referral can be made to the implant surgeon.

Diagnostic and Preparatory Procedures

A number of diagnostic and preparatory procedures are required prior to the surgical phase of treatment. First, a diagnostic wax-up of the missing tooth should be fabricated on the mounted casts. The neck of the wax-up should be exactly in line with the CEJ of the natural tooth on the opposite side of the dental midline. This is a critical step, which must be carried out meticulously.

Once the neck of the wax-up and the CEJ of the opposing natural tooth are in line, the cast should be duplicated. A surgical stent may also be made at this time. If an extra graft procedure (osseous or gingival) is required, a wax-up of the osseous graft, as well as a template, may be helpful.

Prior to the initiation of treatment, the restorative dentist and

the implant surgeon should consult about all aspects of the case and discuss the type of implant system to be used. The surgeon should inform the restorative dentist if there is a particular surgical stent design that he or she prefers.

The final crown restoration may be retained by one of two methods. Both options allow the implant abutment to be retrieved.

Using the first method, the permanent crown is cemented with a provisional cement over the implant abutment. If the clinician opts for the second method, however, the crown is threaded directly to the implant.

Screw-retained implant abutments are the most desirable, because they are retrievable. Cemented abutments were popular at one time, but as a result of the sophistication of available hardware, and the fact that cemented abutments are nonretrievable, their popularity has declined.

It is up to the restorative dentist to determine the requirement for retrievability. Before making a final decision on whether to place a screw-retained or cement-retained final restoration, the restorative dentist should review the available prosthetic hardware needed for each option with the laboratory technician. A decision about whether the final restoration will be screw-retained or cement-re-



tained should be made before the surgery. In either case, the hex-fitting surface of the implant abutment or the screw-retained crown should ideally be a manufactured, machined component. For anti-rotational purposes a hexed implant must be used.

The angulation leeway required by the implant surgeon should also be considered. Cement-retained crowns allow greater leeway than screw-retained crowns.

Cement-Retained Crowns

For cement-retained crowns, the leading labial edge of the implant should be placed exactly in line with the CEJ of the corresponding tooth on the opposite side of the dental midline, or no more than 0.5 mm palatal to this line.

Cement-retained crowns allow the implant surgeon greater leeway in placing the implant than screw-retained crowns. Because the angulation leeway will vary depending on the type of prosthetic hardware used, the restorative dentist must inform the implant surgeon of his or her prosthetic hardware selection.

For cement-retained crowns, the angulation of the implant should be directed through the incisal edge of the proposed restoration, provided the labial leading edge of the implant is at the same height as the CEJ of the corresponding natural tooth on the opposite side of the midline.

Screw-Retained Crowns

With screw-retained crowns, the implant must be angulated so that its angle of exit is through the lingual cingulum area of the tooth to be restored. In deficient ridges, the implant may need to be placed slightly more apical to the CEJ of the adjacent teeth to allow the emergence profile of the restoration to develop properly.

The screw-retained crown is frequently fabricated with a modified ridge lap labial portion to satisfy the esthetic needs of the patient. Although the ridge lap restoration was an acceptable form of treatment in the past, it is losing favor as implant treatment and osseous grafting becomes more sophisticated.

The implant location of a screw-retained crown is usually more palatal than the implant location of a cement-retained crown. It is often placed in the lingual two-thirds of the natural tooth site.

Regardless of whether a screw-retained or a cement-retained crown is selected, the implant surgeon should plan to place an implant of at least 12.0 mm in length. The widest implant available should be used, provided it is in harmony with the anatomy of the region and falls within the borders of the surgical stent. Room must be left for proper crown contours and restorative materials (porcelain and gold). In addition, the implant should be placed so that following healing, after stage II surgery, it is 2.0 to 4.0 mm sub-gingival.

Discussion

Once the treatment plan has been finalized, appropriate surgical stents may be fabricated. These stents should clearly define the guidelines and limits of implant placement, location and angulation for the surgeon.

If all of the above protocols are followed, the restorative dentist will develop a clear vision of the final restoration *before the surgery takes place*. At the same time, the implant surgeon will be fully aware of the end goal, and have all of the available data and armamentarium to carry out the procedure successfully.

It is most appropriate to detail all aspects of the proposed treatment in a written plan, and to review this plan with the patient. In addition, if the restorative dentist has no implant surgical experience, it would be very helpful if he or she watched the implant surgical procedures in the operating room. Similarly, the surgeon should be available to watch the placement of the finished restoration. This way, both the surgeon and the restorative dentist gain invaluable information and knowledge about the other's discipline, which will enhance their diagnostic acumen and treatment planning abilities for future patients.

The implant-retained, maxillary anterior crown is considered to be one of the most difficult implant restorations to complete. A com-

bined team effort is essential if the patient is to receive the best that dentistry has to offer.

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CLINICAL



La stomatite prothétique: étiologie et considérations cliniques

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ABSTRACT

Wearing removable dental prosthesis causes an alteration in the oral microflora. For certain individuals, this new environment is responsible for the development of a particular condition: prosthetic stomatitis. This article reviews the pertinent literature regarding the main predisposing factors causing the disease. It targets the different risk groups and identifies the proposed mechanism for the proliferation of *Candida albicans* on the palatal side of the prosthesis. Various treatments depending on the severity of the disease are also mentioned.

Key words: *Candida albicans*, denture stomatitis, adhesion.

SOMMAIRE

Le port de prothèses dentaires amovibles entraîne des changements dans la flore commensale buccale de l'être humain. Cette nouvelle condition peut amener chez certains individus, le développement d'une affection caractéristique: la stomatite prothétique. Cet article se veut une revue de la littérature pertinente sur les principaux facteurs prédisposants à la stomatite prothétique. Il cible les différents groupes à risque et rapporte les mécanismes proposés dans la littérature pouvant favoriser la prolifération de *Candida albicans* sur l'intrados de la prothèse. Une séquence de traitements est mentionnée en

fonction de la gravité de la stomatite rencontrée.

Mots clés: *Candida albicans*, stomatite, adhérence.

Introduction

La plupart des pays industrialisés affichent un taux d'édentation relativement bas. Au Québec par contre, près de 40 pour cent de la population porte au moins une prothèse dentaire amovible soit partielle ou complète.¹ La présence d'une pièce de prothèse en bouche prédispose au développement d'une affection caractéristique: la stomatite prothétique. La maladie se présente cliniquement comme une inflammation d'importance variable sous une prothèse complète (d'érythème localisé jusqu'à la papillomatose), le plus souvent au maxillaire.² Il y a quelques années, elle était considérée comme étant uniquement une inflammation réactionnelle causée par l'irritation mécanique d'une prothèse mal ajustée ou mal adaptée et était traitée en ce sens. Les travaux de Jørgensen³ au milieu des années 70 ont contribué à mettre en évidence l'importance de la croissance de *Candida albicans* sur l'intrados de la prothèse comme étant un autre facteur possible impliqué dans le développement de la maladie. Depuis, plusieurs autres facteurs prédisposants ont été cernés: une mauvaise hygiène, diverses condi-

tions systémiques, un régime alimentaire déficient et un port continu des prothèses.⁴

Il est important de reconnaître et de traiter cette affection puisque la diminution de l'inflammation associée à son traitement permet de faciliter les procédures cliniques subséquentes. En connaissant bien les facteurs étiologiques de la stomatite prothétique, il est facile d'établir une séquence de traitements spécifique et adaptée à chaque patient.

Les infections fongiques

Les pathogènes fongiques humains sont en voie de devenir l'une des plus importantes causes de mortalité quant aux infections acquises dans les hôpitaux.^{5,6} Trop longtemps mésestimés, ces microorganismes causent maintenant une multitude de problèmes, à la faveur de nouveaux facteurs de prédisposition, en partie dérivés des progrès de la médecine moderne. En effet, on constate que les personnes suivies en chimiothérapie et radiothérapie, les asthmatiques, les gens ayant subi des greffes sont particulièrement vulnérables aux infections fongiques.^{7,8} On constate également que les infections fongiques sont excessivement fréquentes chez les patients porteurs du VIH.⁹ De plus, les thérapies à long terme sur la candidiase buccale et oesophagienne des patients atteints du SIDA ont conduit à l'apparition d'espèces

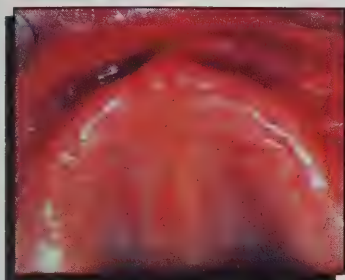


Fig. 1: Zones érythémateuses localisées, affectant principalement la voûte palatine (stade Newton type I).



Fig. 2: Érythème plus diffus, bilatéral, ne dépassant pas le pourtour de la prothèse (stade Newton type II).



Fig. 3: Inflammation franche de la crête alvéolaire avec oedème tissulaire et hyperplasie papillaire (stade Newton type III).

résistantes à certains antifongiques.^{10,11}

On retrouve des pathogènes fongiques humains dans plusieurs genres dont *Aspergillus*, *Blastomyces*, *Candida*, *Coccidioides*, *Cryptococcus*, *Histoplasma*, *Geotrichum* et *Mucor*. Cependant, parmi les infections fongiques, la majorité sont causées par les espèces du genre *Candida*, et plus particulièrement *Candida albicans*.^{5,12} Ce dernier fait normalement partie de la flore commensale de l'être humain. On le retrouve principalement dans la cavité buccale, dans le tractus génito-urinaire et dans certaines parties du tractus gastro-intestinal.¹³ Bien que les mécanismes d'invasion de *C. albicans* chez l'humain soient mal connus, tous admettent la présence d'une étiologie multifactorielle. Présent dans la cavité buccale d'environ la moitié de la population,¹⁴⁻¹⁶ cet organisme peut engendrer, dans certaines conditions, diverses affections que l'on peut diviser en deux catégories principales: les affections aiguës et chroniques.¹⁷⁻²⁰

Les affections aiguës comprennent la candidiase pseudomembraneuse aiguë (muguet) et la candidiase buccale atrophique. Quant aux affections chroniques, plus variées, elles comprennent la glossite rhomboïde médiane, la chéilite angulaire, la candidiase muco-cutanée ainsi qu'une autre forme qui touche plus spécifiquement les porteurs de prothèses amovibles: la stomatite prothétique.¹⁷⁻²⁰

La stomatite prothétique

Les changements dans la flore buccale, causés par l'utilisation des prothèses dentaires, brisent chez certains individus l'équilibre délicat existant entre les niveaux de population de *C. albicans* et ceux des autres micro-organismes présents dans la cavité buccale.

Cette nouvelle condition peut engendrer diverses affections, que l'on désigne sous les termes de candidiase atrophique chronique ou de stomatite prothétique.²⁰

La stomatite prothétique a été décrite en 1962 par A.V. Newton qui l'a divisée en trois stades. Il est intéressant de souligner qu'à l'époque, il n'a pas été fait mention de la présence de *Candida* dans l'étiologie de la maladie.² Le premier stade de Newton (type I) consiste en une petite inflammation localisée de l'épithélium (**Fig. 1**). La seconde phase (Newton type II) se caractérise par une inflammation plus régionale que locale, limitée au pourtour de la prothèse (**Fig. 2**). Quant au dernier stade (Newton type III), il se distingue par la présence d'une hyperplasie papillaire (papillomatose) ou d'une inflammation granulomateuse (**Fig. 3**). Cette condition s'observe plus souvent au maxillaire qu'à la mandibule. La plupart du temps, elle est asymptomatique bien que le patient peut parfois se plaindre de légères douleurs, d'une sensation de mauvais goût ou d'halitose.⁴

Groupes affectés

Le **Tableau 1** regroupe les principaux groupes susceptibles de développer une stomatite prothétique.¹² Les porteurs de prothèses dentaires complètes ou partielles montrent une prévalence élevée (jusqu'à 54 pour cent) de stomatite prothétique.²¹ On la détecte plus souvent chez les femmes que chez les hommes,^{4,22,23} probablement parce que les premières portent une plus grande attention à leur hygiène buccale, consultent plus souvent, et non pas par une plus grande prédisposition naturelle aux problèmes dentaires.²³ Une autre explication possible serait que les femmes, ayant tendance à porter leurs prothèses de façon continue pour des raisons d'esthétique, favoriseraient ainsi le développement de stomaties. Les personnes âgées sont particulièrement sensibles au développement de cette affection car en plus d'être souvent porteurs de prothèses désuètes,²⁴ ils sont habituellement d'importants consommateurs de médicaments. Plusieurs de ceux-ci (e.g. antidépresseurs tricycliques) entraînent des effets secondaires dont certains se caractérisent par

Tableau 1
Principaux groupes à risque

Facteurs traumatiques	Facteurs locaux	Facteurs systémiques
Nouvelle prothèse Prothèse désuète Bruxisme/serrement	Hygiène pauvre Mauvaise alimentation Port nocturne de la prothèse Xérostomie	Endocrinopathies Déficiences immunitaires Syndrome de Sjögren Prise d'anticholinergiques Corticothérapie Antibiothérapie



une réduction du flux salivaire,^{12,16} éliminant par conséquent l'effet de chasse normalement procuré par la salive (important mécanisme de contrôle d'implantation des micro-organismes dans la cavité buccale).^{25,26} Divers autres médicaments (immunosuppresseurs, antibiotiques) peuvent également perturber la flore buccale et ainsi prédisposer aux infections fongiques.^{12,22}

Étiologie

La prolifération de *C. albicans* entre la muqueuse et la prothèse semble être un facteur prépondérant dans le développement de la maladie. Bien que d'autres espèces ont récemment été isolées telles *Candida glabrata* et *Candida tropicalis*,^{21,27} tout porte à croire que seul *C. albicans* possède une adhérence suffisamment importante à la surface de la prothèse pour faciliter sa multiplication. Edgerton et al²⁸ ont montré que la salive provenant des glandes sous-mandibulaires et sublinguales (HSMSL) forme une pellicule acquise à la surface de la prothèse favorisant l'adhésion de *C. albicans* sur le polyméthylméthacrylate. Leurs expérimentations suggèrent que les mucines contenues dans ces deux types de salive servent de récepteurs à certaines adhésines de *C. albicans*. Dans des sites soumis au flux salivaire, ces mucines inhiberaient l'implantation de *C. albicans* en saturant les diverses adhésines du mycète. Ces mêmes glycoprotéines constitueraient toutefois un facteur de colonisation lorsqu'elles sont adsorbées à l'intrados d'une prothèse au maxillaire (où le flux salivaire est réduit): surface irriguée par les glandes palatines mineures qui offrent une sécrétion riche en mucines (les mucines ainsi adsorbées à la surface de la prothèse contribueraient à retenir *C. albicans* à la surface de celle-ci). La croissance fongique entre la muqueuse et la prothèse se traduirait par une baisse localisée du pH et pourrait être un facteur d'irritation de l'épithélium sous-jacent.²⁹ De plus, une prothèse mal ajustée ou désuète, traumatisant la muqueuse, entraînerait la production d'un transsudat sérique qui se mêlerait à la pellicule acquise, favorisant également la colonisation de la surface prothétique par *C. albicans*.³⁰

De récents développements suggèrent que l'agent étiologique

primaire de la maladie ne serait pas seulement *C. albicans*. Un facteur bactérien serait également impliqué.³¹ La formation de plaque à l'intrados de la prothèse influencerait l'adhésion du mycète, les habitudes alimentaires pouvant jouer un rôle important à ce niveau. En effet, une diète riche en sucres semble favoriser la stomatite par l'intermédiaire de deux mécanismes différents. Premièrement, la force d'adhésion de *C. albicans* sur la surface de la prothèse serait liée selon Branting et al³¹ à la présence de plaque bactérienne, et non pas uniquement à la présence d'interactions hydrophobiques (levure-résine acrylique) comme précédemment décrit par Klotz et al.³² La plaque formée par *Streptococcus mutans* en présence de sucrose, serait un facteur essentiel à l'implantation de *C. albicans* sur la prothèse. En second lieu, un apport élevé en hydrates de carbone augmenterait de façon directe la force des liens entre *C. albicans* et les cellules épithéliales favorisant donc la colonisation, et par conséquent la maladie.^{13,33} C'est cette colonisation de la prothèse qui causerait l'inflammation observée cliniquement. Dans tout le processus, il n'y aurait pas d'invasion de l'épithélium par *C. albicans*. Les diverses composantes sécrétées par le mycète suffiraient à engendrer la réponse inflammatoire observée dans la stomatite prothétique.²⁰

Les érythèmes de la muqueuse palatine observés chez les patients affectés d'une stomatite de type I seraient dus selon Newton, non pas à une invasion fongique, mais à l'occlusion des canaux des glandes palatines mineures.² Tout traumatisme à la muqueuse peut également entraîner des érythèmes. Ils peuvent donc survenir peu de temps après l'insertion de la prothèse, ou encore dans le cas de port de prothèses désuètes. O'Grady et al³⁴ ont d'ailleurs démontré qu'un traumatisme pouvait faciliter l'implantation de *C. albicans* dans la cavité buccale des rats. À ce niveau, tout traumatisme de la muqueuse peut donc constituer un facteur prédisposant au développement d'une stomatite prothétique. Les habitudes para-fonctionnelles comme le bruxisme, peuvent engendrer des

facteurs de stress sur la muqueuse causant ainsi des érythèmes.^{4,23}

Plusieurs autres facteurs sont impliqués dans l'étiologie de la stomatite prothétique. Ainsi, une mauvaise hygiène peut influencer grandement la prévalence de cette affection. De même, chez les sujets qui gardent leurs prothèses pendant la nuit, la prévalence de la stomatite prothétique peut doubler.³⁵ Diverses causes génétiques ou systémiques peuvent également favoriser l'apparition des symptômes. Les patients souffrant de diabète sucré, d'hypoparathyroïdie, de xérostomie et ceux traités par radiothérapie sont plus exposés à développer une stomatite prothétique.^{4,7,12}

Condition associée

La stomatite prothétique est souvent associée à la chéilite angulaire.^{4,6} Cette dernière est favorisée chez les porteurs de prothèses par la perte de dimension verticale d'occlusion associée à des prothèses inadéquates, au bruxisme, à la perte de tonicité des tissus associée au vieillissement et à la mauvaise habitude qu'on certains de lécher fréquemment les commissures labiales. Le diagnostic étiologique de la chéilite angulaire doit aussi prendre en considération certains facteurs systémiques dont les carences nutritionnelles ou la déficience en fer (comme dans l'anémie ferriprive).¹³ L'accentuation du repli des lèvres aux commissures labiales peut favoriser la prolifération de micro-organismes dont *C. albicans*. À l'opposé des autres types de candidiases buccales, la chéilite angulaire peut engendrer des douleurs modérées.^{6,7,19} Bien que cette pathologie soit souvent associée à la présence de *C. albicans*, de récents développements ont montré que *Staphylococcus aureus* peut parfois être isolé des lésions.¹³

Les résines de conditionnement

Divers matériaux ont été élaborés afin de réduire l'inflammation associée à la stomatite prothétique. Ayant de multiples usages, les résines de conditionnement peuvent servir à corriger temporairement les imperfections entraînant des érythèmes. Leurs propriétés résilientes tendent à réduire la pression sur les tissus,

mais cette qualité diminue de façon considérable avec le temps. En effet, lors de séjours prolongés en bouche, ils durcissent, deviennent tachés et poreux.³⁶ En les renouvelant régulièrement, cela contribue à réduire la facilité de *C. albicans* à coloniser l'intrados de la prothèse. Plus récemment, certains chercheurs ont employé des conditionneurs de tissus mélangés à divers antifongiques.^{37,38} Ces derniers produits peuvent être particulièrement intéressants dans le traitement de la stomatite chez les patients dont la coopération est plus difficile à obtenir.

Thérapies pharmacologiques disponibles

Bien qu'il n'existe pas de thérapie spécifique appliquée aux affections causées par *Candida*, la plupart des différentes formes de candidiases buccales répondent favorablement à un traitement aux antifongiques. Les antifongiques employés se divisent en trois groupes: les allylamine/thiocarbamates, les dérivés azole et les antibiotiques de type polyène.³⁹ Dans les deux premiers groupes, nous retrouvons le clotrimazole, le fluconazole, l'itraconazole et la terbinafine. Dans la classe des polyènes, nous retrouvons le nystatin et l'amphotéricine B. Ce dernier est employé plus particulièrement pour le traitement des mycoses systémiques, alors que le nystatin est d'usage courant dans les cas de candidiases buccales aiguës et chroniques.

Les antifongiques ne devraient normalement pas être employés seuls dans le traitement de la stomatite prothétique puisque différentes études ont montré que dans de tels cas, il y a souvent récurrence après la fin des traitements.⁴⁰⁻⁴² Ce dernier point confirme la nécessité d'une approche globale dans le traitement de la maladie.

Considérations cliniques

Il est important de diagnostiquer la stomatite prothétique particulièrement chez les patients souffrant de troubles systémiques.^{23,43} Les personnes affectées du diabète entre autres, sont plus susceptibles aux infections à *C. albicans*, possèdent une moins bonne vascularisation tis-

sulaire et ont tendance à une résorption alvéolaire plus rapide.²³ Les patients atteints du syndrome de Sjögren sont également problématiques puisque le manque de salive contribue à augmenter l'irritation sous la muqueuse.²³ Les patients porteurs de prothèses dentaires devraient consulter plus régulièrement afin de vérifier la stabilité et la rétention de la prothèse, la qualité de la muqueuse et de la crête résiduelle et prévoir un renouvellement régulier de la prothèse.

Peu importe la gravité de la stomatite rencontrée, un accent doit être mis sur l'importance de l'hygiène buccale et prothétique. En effet, lorsque mal nettoyées, les prothèses peuvent servir d'agent de recolonisation de la cavité buccale en agissant comme réservoirs.¹⁶ Les prothèses peuvent être facilement désinfectées en les immergeant toute la nuit dans une solution de chlorure de benzalkonium (Zéphiran), de chlorhexidine (0,12%-2%) ou d'eau de javel (1:50).^{15,16} Les muqueuses buccales devraient également être nettoyées à l'aide d'une brosse à soies souples ou d'une gaze humide.

La conduite clinique varie en fonction de la gravité de la stomatite. Pour les patients atteints au stade Newton type I, il est bon de vérifier la présence possible de zones de pressions ou de contacts occlusaux trop marqués. Les patients devraient être invités à retirer leurs prothèses la nuit et à maintenir une bonne hygiène buccale.

Dans les cas de stomatite de stade Newton type II, un ajustement judicieux de la prothèse existante peut améliorer la condition. Si la prothèse ne comporte pas de zones d'irritations, un traitement aux conditionneurs de tissus peut être prodigué, suivi d'un regarnissage ou de la confection d'une nouvelle prothèse. Les patients quant à eux devraient suivre les mêmes conseils que dans les cas de stomatite Newton type I.

Les patients atteints au niveau Newton type III, dont la condition est plus avancée et qui répondent plus ou moins bien aux conditionneurs de tissus, peuvent recevoir une thérapie antifongique (entreprise idéalement après une confirmation de la présence de *C. albicans* par culture sur gélose Sabouraud) pendant une période

plus ou moins prolongée selon la gravité du cas. Le nystatin, le clotrimazole ou le kétoconazole peuvent être utiles dans ces cas. Une suspension de nystatin, des comprimés de kétoconazole ou de clotrimazole (comprimés vaginaux) constituent les formes pharmaceutiques habituellement employées.^{6,12} Certains vernis antimycotiques appliqués sur l'intrados de la prothèse ont déjà été employés avec les patients se montrant moins coopératifs.⁴⁴ Les stomatites de classe III, avec hyperplasie papillaire fibreuse, réfractaires aux traitements antifongiques ainsi qu'aux conditionneurs de tissus doivent éventuellement être réséqués chirurgicalement.

Conclusion

Comme dans la majorité des cas la stomatite prothétique répond bien aux conditionneurs de tissus et aux antifongiques, il est possible pour le dentiste clinicien d'améliorer la condition des patients, et plus aisément encore lorsque ceux-ci adoptent de bonnes habitudes d'hygiène buccale. Cependant, puisque certains patients répondent moins bien à l'utilisation de conditionneurs de tissus, et devant l'émergence inquiétante de résistances aux antifongiques couramment utilisés, d'autres alternatives doivent être recherchées.

Bien que les diverses interactions pouvant exister entre *C. albicans*, certaines bactéries et les résines acryliques ne soient pas encore bien comprises, il apparaît évident que la colonisation des prothèses dentaires et de la muqueuse buccale est un phénomène d'une grande complexité. D'autres études sont donc nécessaires afin de permettre l'identification des facteurs fongiques et bactériens impliqués dans cette colonisation, de même que dans la pathogénèse qui en découle. Les résultats de ces recherches pourront éventuellement être utilisés pour la mise au point de nouvelles substances antifongiques ou de nouvelles résines (incluant de nouveaux procédés de fabrication) pouvant prévenir la colonisation des prothèses dentaires par les micro-organismes re-

sponsables des stomatites prothétiques. ■

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Sensodyne-F Toothpaste
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Sensodyne-F Baking Soda Clean Toothpaste

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Colgate Total -- Fresh Stripe Toothpaste
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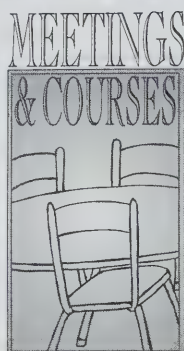
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(613) 523-1770; 1 (800) 267-6354; fax: (613) 523-7736*





INTERNATIONAL



November 27-30

5th Pakistan International & 18th National Dental Conference in Karachi, Pakistan. Contact the College of Dental Surgery, Liaquat Medical College, Jamshoro, Hyderabad, Sindh, Pakistan.

December 6-7

Symposium — 20 Years in Periodontal Local Drug Delivery: Current Applications and Future Trends in London, U.K. Contact the Conference Manager (Dental), The Medicine Group (Education), 62 Stert St., Abingdon, Oxfordshire, OX14 3UQ, U.K. Tel.: +44 1235 555770, or fax: +44 1235 554691.

February 14-16, 1997

First International Meeting of the Egyptian Periodontal Society in Cairo, Egypt. Special presentation by Professor P.I. Brånemark. Contact E.P.S. First International Meeting, c/o Odyssey Travel, 31, Ministry of Agriculture St., Dokki, Cairo 12311, Egypt. Tel.: 202 348 5305, or fax: 202 349 4186, or e-mail: ruodc@rusys.EG.net

February 18-21

International Dental Expo & Conference Indonesia '97 in Jakarta. Contact the Hong Kong (Asia) Exhibition Co, Ltd., No. 3, 7/F., Kin Tak Fung Commercial Bldg., 467-473 Hennessy Rd., Wanchai, Hong Kong. Tel.: (852) 2591 9823 or fax: (852) 2573 3311.

March 16-23

Caribbean Travel and Learn Cruise: Harmony and Humor for the Dental Team — Dr. Ken Snyder. Sponsored by the University of British Columbia, Vancouver, B.C. Contact Cruise Holidays. Tel.: 1-800-665-6313 (Canada and U.S.A.), or fax: (604) 372-1630.

April 2-7

19th Asia Pacific Dental Congress in Colombo, Sri Lanka. Contact the Congress Secretariat, c/o Sri Lanka Dental Association, 275/75 Baudhaloka Mawatha, Colombo-7, Sri Lanka. Tel./fax: (94-1) 595147.

June 5-7

7th International Congress on Reconstructive Preprosthetic Surgery in Copenhagen, Denmark. Contact the Congress Secretariat, Department of Oral & Maxillofacial Surgery, School of Dentistry, Faculty of Health Sciences, University of Copenhagen, 20, Nørre Allé, DK-2200 Copenhagen N, Denmark. Tel.: +45 35 32 66 11, or fax: +45 35 32 66 25.

June 5-8

1st International Dental Congress Lithuania in Vilnius. Contact VVAA Travel Agency, P.O. Box 8153, 3503 RD UTRECHT, The Netherlands.

June 9-14

73rd Congress of the European Orthodontic Society in Valencia, Spain. Contact the Secretariat, GAMA CONGRESOS, S.A., Recaredo, 31, 46001 Valencia (Spain). Tel.: 34 6 3921311, or fax: 34 6 3912020, or e-mail: gama@ctv.es

June 26-28

Turkish Dental Association's 4th Dental International Congress in Istanbul, Turkey. Contact the Chamber of Dentists of Istanbul, Cumhuriyet Cad. 361 / 3, 80220 Harbiye, Istanbul, Turkey. Tel.: 0.212. 296 21 05, or fax: 0.212. 296 21 04.

September 6-9

85th Fédération Dentaire Internationale (FDI) Annual World Dental Congress in Seoul, Korea. Contact Korea National Tourism Organization, Toronto Office, 480 University Ave., Suite 406, Toronto, Ont., Canada, M5G 1V2. Tel.: (416) 348-9056, or fax: (416) 348-9058.

October 8-10

6th World Congress on Preventive Dentistry 1997 in Cape Town, South Africa. Contact the Secretariat-WCPD '97, P.O. Box 1266 Pretoria, 0001. South Africa. Tel.: +27 12 319-2552, or fax: +27 12 323-7616, or e-mail: WCPD1997@medic.up.ac.za

CANADA



November 1-2

Southern Ontario Surgical Orthodontic Study Group in Windsor, Ont. Contact Dr. Jeff Berger. Tel.: (519) 258-2632, or fax: (519) 258-2637.

November 2

Treatment Planning Crowns and Bridges for Our Aging Population. Presenter: Dr. Joseph A. Clayton. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 2

Local Anesthesia: Can't Live With It, Can't Live Without It — Dr. Mel Hawkins. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver, B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

November 2

The University of Toronto, Faculty of Dentistry's Alumni Association presents its **Alumni of Distinction Dinner and Dance**. Contact Wynona Bardgett. Tel.: (416) 979-4902, or 1-800-74-DDS-UT.

November 2

Current Concepts in Restorative Dentistry. Guest Lecturer: Dr. Kevin J. Donly. Contact the University of Western Ontario, Faculty of Dentistry, Continuing Dental Education, Room 1003, Dental Sciences Building, London, Ont. N6A 5C1. Tel.: (519) 661-3902, or fax: (519) 661-3875.

November 7, 14, 21, 28

Introduction to Orthodontic Appliances. Brian McCann. Contact Continuing Dental Education, Faculty of



Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

November 15

Current Issues in Pediatric Dentistry. Speaker: Dr. Michael Sigal. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

November 15-16

Dental Update '96. Coordinator: Dr. Andrew Thompson. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 16

The Art of Anterior and Posterior Restorations for the 21st Century — Dr. Jimmy Eubank. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver, B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

November 16

Ontario Dental Society of Anesthesiology Annual Meeting in Toronto. Featured speaker: Dr. James Phero. Contact Rosa Ruggiero. Tel.: (416) 498-8484, or fax: (416) 498-8487.

November 21

Consumer Products. Lecturer: Janice Pimlott. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

November 22

Current Developments in Restorative Materials and Techniques. Dr. Karl F. Leinfelder and Dr. Pierre Boudrias. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

November 23

Building the More Effective Practice. Dr. Dick Barnes. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

November 23

Participation Course in Local Anesthesia. Presented by: Dr. J. Mel Hawkins and Dr. David Isen. Contact

the Ontario Dental Association, Professional Development, 4 New St., Toronto, Ont. M5R 1P6. Tel.: 1-800-387-1393 ext. 304, or fax: (416) 922-9005.

November 27

Dentistry: The Next Generation — 59th Annual Winter Clinic. Contact the Toronto Academy of Dentistry, 902-170 Bloor St. West, Toronto, Ont. M5S 1T9. Tel.: (416) 967-5649, or fax: (416) 967-5081.

November 30

Medical Emergencies in the Dental Office. Presenters: Dr. Reginald H.B. Goodday and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

November 30

Dental Emergencies and Their Management — Course coordinators: Dr. Jeff Coil and Dr. Perry Trester. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver, B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

December 6

Marketing and Managing for Success. Ontario Academy of Dentistry Course. Presenter: Dr. Howard Glazer. Contact Wendy Maginn or Dr. Stewart Sigismund. Tel.: (416) 323-0101.

December 7

Forensic Identification: An Overview of Advanced Topics in Legal Dentistry — Dr. David Sweet. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver, B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

December 7

The Alpha Omega Memorial Lecture: Cosmetic Dentistry — New Vistas in Communication. Dr. Ken Neuman. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

January 10, 1997

Facial Pain Management Update, 1997. Speaker: Dr. Parker Mahan. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W.,

Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

January 11

Temporomandibular Joint Disorder. Presenters: Dr. A.K. ElGeneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

January 24

Soft Tissue Management — Non-surgical Periodontal Therapy. Dr. Surinder N. Bhaskar. Contact the Toronto Academy of Dentistry, 902-170 Bloor St. West, Toronto, Ont. M5S 1T9. Tel.: (416) 967-5649, or fax: (416) 967-5081.

February 1

A Review of Common Intraoral Mucosal Lesions in Brandon, Manitoba. Dr. John Perry. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 18

Pharmacology for the Dental Professional. Lecturer: Patrick Mayo. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

February 21-22

Medical Emergencies in the Dental Office. Dr. Ron Boyar. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 28

Excellence With the Most Recent Advances in Endodontics Today. Speaker: Dr. Clifford Ruddle. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 7-8

The Use of Automated Handpieces and Nickel Titanium Instruments in Endodontics. Dr. Carl E. Hawrish and Dr. William Christie. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

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March 14

Occlusion and Esthetics — an Oxy-moron. Speaker: Dr. Bruce Small. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 20

Massage Therapy for the Dental Professional. Lecturer: Alisa Casault. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

May 4-6

2nd Trans-Pacific Endodontic Conference in Vancouver, B.C. Contact Dr. Wayne Pulver, 159 Willowdale Ave., Willowdale, Ont. M2N 4Y7. Tel.: (416) 222-9900, or fax: (416) 222-9901.

May 20

Herpes and Hepatitis. Lecturer: Dr. Barbara Romanowski. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

U.S.A.



November 4-5

American Board of Oral and Maxillofacial Radiology — 1996 Certifying Examination in San Diego, Calif. Application deadline was May 3, 1996. Contact Dr. R. Curtis Lundeen, Oral Radiology, Oregon Health Sciences University, School of Dentistry, 611 S.W. Campus Dr., Portland, Ore. 97201-3097. Tel.: (503) 494-8930.

November 14-17

American Society of Addiction Medicine's 9th Annual Conference on Nicotine Dependence in Washington, D.C. Contact ASAM, 4601 North Park Ave., Arcade Suite 101, Chevy Chase, Md. 20815-4520. Tel.: (301) 656-3920, or fax: (301) 656-3815.

January 23-26, 1997

22nd Yankee Dental Congress — "Pathways to Success" in Boston, Mass. Contact Dr. J. Steven Tonelli, General Chair, Massachusetts Dental Society, 83 Speen St., Natick, Mass. 01760-4144. Tel.: (508) 651-7511.

April 5-8

1997 Star of the North Meeting in Minneapolis, Minn. Contact the Minnesota Dental Association, 2236 Marshall Ave., St. Paul, Minn. 55104. Tel.: (612) 646-7454.

DENTAL MEETINGS



January 16-18

Manitoba Dental Association Annual Meeting in Winnipeg. Contact Mr. Ross McIntyre. Tel.: (204) 453-0055, or fax: (204) 453-0108.

April 4-5

CDA Board of Governors Interim Meeting in Ottawa, Ont. Contact Suzanne Burton. Tel.: 1-800-267-6354.

May 1-3

Ontario Dental Association Annual Spring Meeting in Toronto. Contact Diana Thorncroft. Tel.: (416) 922-3900, or fax: (416) 922-9005.

May 8-10

Newfoundland Dental Association Annual Meeting in Gander. Contact Dr. Robert Janes. Tel.: (709) 256-3889.

May 23-24

New Brunswick Dental Society Annual Meeting in Fredericton. Contact Barbara Wishart. Tel.: (506) 452-8575, or fax: (506) 452-1872.

May 24-28

26e Congrès annuel de l'Ordre des dentistes du Québec — Les Journées dentaires du Québec in Montréal. Contact Nicole Pagé or Ginette Boutin. Tel.: (514) 875-8511, or fax: (514) 875-1561.

May 27-June 1

Alberta Dental Association Annual Meeting in Jasper. Contact the Alberta Dental Association. Tel.: (403) 432-1012.

June 5-7

Prince Edward Island Dental Association Annual Meeting in Mill River. Contact Nettie Likely. Tel.: (902) 566-5199, or fax: (902) 892-4470.

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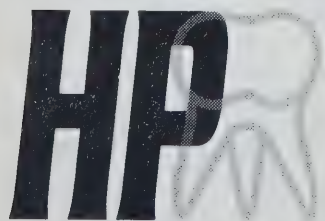
- 1/2 cost share opportunity
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- Retail mall location
- High volume extended hours
- New leaseholds
- High quality equipment
- Opportunity for multiple purchasers

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NORTHWEST TERRITORIES -

Central Arctic: Part time/full time position available in Northwest Territories. Emphasis on quality, gentle dentistry. Please reply to CDA ACCESS Box # 2707, or fax resume to (403) 982-4512. (08/10)

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surgical extractions. Eventual purchase. Practice merger considered. Phone (403) 454-3609, home. (08/10)

ALBERTA - Edmonton: West-end office requires a full-time associate to work extended hours including two nights and Saturdays weekly, and every fourth Sunday. The work week can be five days or a condensed four. The office is emergency walk-in orientated. Contact Dr. E. Azarko (403) 483-7080. (09/11)

ALBERTA - Lethbridge: Excellent opportunity for an associate with a view to partnership. Well-established, preventive, computerized five-operator practice, seeks motivated associate. If you are looking to practice in a friendly office where you will be busy and appreciated, call Ellen (403) 320-6644, or write to: 728-13 Street North, Lethbridge, Alberta T1H 2T1. (10/10)

ALBERTA - Central Region: Associate required. Busy group practice in central Alberta requires a full-time dentist. The position is available immediately, however, the start date is flexible. Contact Fran at (403) 347-5008 or Fax (403) 343-9421. (10/12)

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ONTARIO - Ottawa: Practising endodontist wanted in Ottawa. Please reply to CDA ACCESS Box #2708. (08/10)

ONTARIO - Guelph: Orthodontist/endodontist/associate wanted. We require a full-time or part-time associate, with or without own patient base. Individuals must be highly motivated, caring team players with good communication and clinical skills. We are a computerized practice employing two full-time hygienists. A P.D.A. and an excellent experienced support staff. Associates would work days, extended hours in the evenings and Saturdays. Future buy-in options available. This would be an excellent opportunity for a new graduate or an established individual seeking a busy practice. For more information please call (519) 824-7930. (09/10)

ONTARIO - Toronto: Associate wanted to share and build a practice with established oral surgeon in Toronto. Please respond with C.V. to CDA ACCESS Box # 2713. (09/11)

ONTARIO - Campbellford: Very busy dynamic general practice located less than two hours east of Toronto has an opening for a warm and caring individual who practises high-quality dentistry. Willing to train new graduate. Hospital privileges available and future buy-in possible for the right person. Call (705) 653-2221 days, (613) 967-7840 evenings and weekends. (10/12)

ONTARIO: Dental hygienist seeking employment full-time or temp. Five-years dental office experience as CDA. Eager to work with dental team, will relocate. References available, please leave a message at (705) 568-8175, or fax (705) 567-3218. (10/10)

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Miscellaneous

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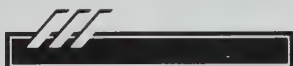
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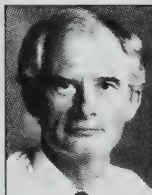
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Research Articles:

Research articles are contributions dealing with research, diagnosis and treatment of dental disease, studies in education, clinical and laboratory research, and other detailed investigations pertinent to dentistry and related fields. The text should not exceed 2,500 to 3,000 words.

Clinical Reports:

Are brief (up to 2,000 words) reports, case histories and clinical observations. References should be limited, and a minimum number of illustrations used.

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Manuscript Requirements:

Submit three (3) copies (original and two (2) duplicates) to the Editor, *Journal of the Canadian Dental Association*, 1815 Alta Vista Drive, Ottawa, Ontario K1G 3Y6. All graphs, photographs, charts and tables must also be submitted in triplicate. Authors are asked to submit their articles on computer disks, if possible, stored in Word-Perfect, Word Star or ASCII (IBM-compatible programs). Hard copy, in triplicate, must still be provided for articles submitted on disk. For more details, please contact the editorial staff.

A covering letter designating one author as the correspondent, with his or her full address, telephone number and fax number (if available), must accompany the article. All research articles are subject to review by selected consultant referees. Acceptance or rejection of an article for publication is based on the referees' reports and editorial consideration.

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A statement of the purpose, results and conclusion of the work must accompany all manuscripts. All abstracts will be translated into French (or English, as the case may be). Abstracts should be approximately one typewritten page (250 words in length), maximum.

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The authors' names, degrees, and university affiliations must be provided. Authors are responsible to disclose to the Editor any financial interests they may have in products mentioned in their article.

References:

References should be selective. They must be keyed to the text and numbered consecutively. *Journal* references must give the author's name, article title, abbreviated journal name, volume number, first and last page numbers of article and year of publication, i.e.,

1. Hechter, F.J. Symmetry and dental arch form of orthodontically treated patients. *J Can Dent Assoc* 44:173-184, 1978.

For books, give the author's name, book title, location and name of publisher, and year of publication, i.e.,

2. Kilpatrick, H.C. *Works simplification in dentistry*, ed. 2, Philadelphia: Saunders, 1964.

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↑ The Exhibit Hall: A vibrant marketplace



↑ New at the Convention this year, the Young Dentist Program was a tremendous success



↑ Official Opening of the Exhibit Hall: (from left to right)
Dr. Richard Sandilands; Dr. Burton Conrod;
Dr. Toby Gushue, Vice President; Dr. Tom Breneman;
Dr. Michel Jahjah, Chair of the 1996 Convention;
Dr. James Brookfield, President; Dr. Barry Dolman,
President-elect; Mr. Jardine Neilson, Executive
Director; Dr. Louis Dubé and Dr. David Somer
(positions held on August 15, 1996)

At the start of their day, the children
had breakfast with... Ish Kabbile! ↓



One player seems to be "in luck"
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SATURDAY, AUGUST 17

☐ 960817-010/011/012/013 A New Look at Periodontics in the Nineties:
Louis Touyz

SUNDAY, AUGUST 18

☐ 960817-020/021/022/023 Presenting Ideal Treatment and Getting a Yes!:
William Blatchford

MONDAY, AUGUST 19

- ☐ 960817-030/031/032/033 New Perspectives in Soft Tissue Management:
Part I & II: **Herbert Bader, Jane Jones**
- ☐ 960817-040/041 Aesthetic Resin Bonded Restorations & Clinical Limitations:
Mike Suzuki
- ☐ 960817-060/061/062 Management of Elderly Patients/Caring for Dental Patients
in the Long Term Care Setting: **Ronald Ettinger**
- ☐ 960817-070/071 Dentistry-TMD/Grieve Memorial Lecture: **Harold T. Perry**
- ☐ 960817-090 Planification financière pour le personnel dentaire: **Gisèle Bourgeois**
- ☐ 960817-100 Effective Communication: **Marion Balla**
- ☐ 960817-110 Le sondage: l'essence du dépistage, diagnostic et traitement en
parodontie: **Michel Couture**
- ☐ 960817-120 Common Oral Lesions: **Alan Drinnan**
- ☐ 960817-130 KEYNOTE: Nutrition and the Politics of Food: **Michael F. Jacobson**
- ☐ 960817-140/141 Glove Usage: **Wava Truscott**
- ☐ 960817-150/151 Guiding the Developing Dentition: **Jon Kapala**
- ☐ 960817-160/161 Pharmacology of Pain Control: **Daniel Haas**
- ☐ 960817-170/171 Oral Appliances for the Treatment of Snoring and/or
Obstructive Sleep Apnea: **Alan Lowe**
- ☐ 960817-180 Les radiographies, réponses aux inquiétudes des patients:
Michel Deschamps
- ☐ 960817-190 La désinfection-stérilisation: soyons rationnels: **René Guy Landry**
- ☐ 960817-200 Tax Loopholes: **Thomas Olson**
- ☐ 960817-210 Things that Make a Difference in the Success of your Practice:
Don McCallum
- ☐ 960817-480 Refined Tooth Preparation for Restorative Procedures: **Brian Kucey**
- ☐ 960817-481/482 Did You Get It? — Final Impressions: **Brian Kucey**

Young Dentist Program — Monday, August 19

- ☐ 960817-220 Practical Financial Management for New Dentists: **Peter Volpé**
- ☐ 960817-490 Insurance Protection for Financial Well-Being: **Jeff Wollburn**
- ☐ 960817-230 Aesthetic Posterior Restorations: **Mike Suzuki**
- ☐ 960817-240 Osseointegration: Its Uses and Abuses:
Perry Goldberg, Marvin Werbit

TUESDAY, AUGUST 20

- ☐ 960817-250 KEYNOTE: Sense, Nonsense and Science: **Joseph Schwarcz**
- ☐ 960817-260/261/262 Anterior Crown and Tooth Coloured Inlay/Onlay/Aesthetics
and Function: **John Nasedkin**
- ☐ 960817-270/271 The Patient Driven Practice: **Derek Hill**
- ☐ 960817-280/281/282/283 Dentin and Pulp Issues/Pulp Fiction: **Charles Cox**
- ☐ 960817-290/291 Managing Stress Creatively: **Marion Balla**
- ☐ 960817-300 Esthétique et fonction en Pédiodontie: **Patrick Canonne**
- ☐ 960817-320 Toothbrush Research: **Samuel Yankell**
- ☐ 960817-330/331/332 Periodontal Surgical Procedures/Periodontal Treatment:
Cary Shapoff
- ☐ 960817-340 Managing Traumatic Injuries: **Jon Kapala**
- ☐ 960817-350 Problèmes et solutions en implantologie: **Jacinthe Larivée**
- ☐ 960817-360/361/362 Infection Control: What You Don't Know Will Hurt You!/
Infection Control Into the Next Century: **Trey Petty**
- ☐ 960817-370 Dentinal Sensitivity: **Louis Touyz**
- ☐ 960817-380 KEYNOTE: Les clés d'une alimentation gagnante:
Louise Lambert-Lagacé
- ☐ 960817-390/391 Running a Successful Practice: **Gisèle Bourgeois**
- ☐ 960817-400 La prothèse partielle amovible: conception et techniques de cas
simples et avancés: **Gilles Gauthier**
- ☐ 960817-410 Les complications sinusales: **Huan Pham**
- ☐ 960817-420 Emergencies in the Dental Office: **Alan Drinnan**
- ☐ 960817-430 Effective Communication: **Mary Ann Kindy**
- ☐ 960817-440 Interception en dentition mixte: **Daniel Tanguay**
- ☐ 960817-450 Pourquoi utiliser la digue? **Denis Robert**
- ☐ 960817-460 Using Tax Savings to Secure Your Retirement: **Thomas Olson**
- ☐ 960817-470 Science: It's More Than Just Puffs and Bangs: **Joseph Schwarcz**

BOOK REVIEWS

Manual of Asthma Management

edited by P. M. O'Byrne and N. C. Thomson

1995, W.B. Saunders Co. Ltd.: Toronto; \$77.95 (Cdn); 851 pages
ISBN: 0-70201-781-7

This soft-covered book has been called the "Bible of Asthma." With its 851 pages, covering 46 chapters, it is difficult to disagree. The book, through its 70 contributors, brings together a tremendous resource of articles, studies and protocols between two covers. The sources are directly referenced in the body of the text, and an extremely extensive up-to-date bibliography follows each chapter. In addition, each reference of particular benefit is highlighted in the bibliography and each chapter is concluded by a summary of the key points.

This book is excellent in that it quotes numerous studies, and discusses areas of controversy and alternative treatment strategies. It is comprehensive in every respect, yet practical. It allows the reader to answer day-to-day clinical questions about asthma management so that he or she can individualize treatment. Guidelines are supported by referenced studies. Where controversy exists, the text lists non-supporting studies as well.

The goals in treating asthmatic attacks are to prevent death, relieve hypoxemia and normalize lung function and, finally, to avoid further relapses. Achieving these aims requires detailed knowledge about dosing and the mode of administration of the drugs used in treatment, as well as the ability to recognize asthmatic attacks in their early stages. This book discusses all of these subjects with special emphasis on the results (positive and negative) of controlled trials with different age groups.

The book includes multiple references to the recent discoveries

in the pathogenesis of asthma, particularly the cascade of events that occur following the activation of inflammatory cells and mediator release. The chapters on the benefits of using spacers as opposed to only MDI (metered dose inhalers), and the chapter on steroids are particularly interesting. It appears that activated inflammatory cells remain in the airways of asthmatics even when they are considered stable and asymptomatic. In addition, a number of references indicate that stress can trigger an attack. The mechanism may be due to the indirect effects of hyperventilation and/or catecholamine release (lowering serum potassium).

Similarly, it appears that the factors which put a patient at highest risk for exacerbations are: previous hospital admissions (particularly in the previous 12 months), psychiatric disease, use of or recent withdrawal from systemic steroids, use of three or more categories of drugs, and psychosocial problems.

The importance of proper control, regular patient monitoring (peak flow meters versus patient perceptions) and the use of asthma clinics are also emphasized.

Of special interest to dentists are the discussions on stress management, reactions to certain drugs (aspirin and non-steroidal anti-inflammatories), bisulfite, histamine releasers, and various materials used in dentistry such as nickel and latex. The use of prophylactic bronchodilators is controversial except in exercise-induced asthma. Their action is not only bronchodilatory, but they also appear to have other effects, including decreased mediator release, enhanced mucociliary clearance and decreased vascular permeability.

In summary, this is an excellent text addressing almost every subject imaginable with respect to the most common chronic disease in adults and children, the preva-

lence of which appears to be increasing and is costing some six billion dollars US per year.

Reviewed by:

Earle R. Young, B.Sc., DDS,
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Oral Biology

by B.G. Jansen van Rensburg

1995, Quintessence Publishing Co.
Inc.: Berlin; \$78.00 (US); 524 pages,
black and white illustrations
ISBN 0-86715-271-0

This book presents the basic oral biological sciences in an integrated manner that is suitable for both dental students and dental professionals.

The book is well-organized. Part I deals with general concepts in the biological sciences (embryology, gross anatomy, histology and physiology), while Part II deals with more specialized areas in oral biology (tooth eruption, saliva, fluoride, taste, mastication, etc.). Part II also builds on some of the concepts presented in Part I. The text is easy to read, but, unfortunately, it contains many spelling and typing errors.

The chapter on fluoride is very good and reflects current thinking. However, in an effort to integrate the biological sciences, the author has sacrificed the comprehensiveness and the depth of information required by dental students. The references given are mainly textbooks in various disciplines. Current information is therefore lacking in several areas. For example, a lot is now known about enamel proteins and their role in enamel mineralization, yet only a cursory statement about these is made. Also, nothing is mentioned about dentin sensitivity — an important issue in the practice of dentistry.

The information presented is generally accurate, but the author

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fell short in stating that digestion commences in the stomach. This is inaccurate. Protein digestion begins in the stomach, and the process of digestion commences in the oral cavity.

There is a dearth of anatomical information. All of the sections, with the exception of the one section on lymphatic drainage, lack depth. In the sections on mandibular movements, mastication and swallowing, there are no diagrams to assist the reader in following the descriptions.

In conclusion, this book presents itself as an integrated overview of the basic oral sciences. As such, it has fulfilled the author's objective. However, the book lacks depth in some areas and fell short in presenting the basic anatomical information. As a result, dental undergraduate students will have to follow the path that the author strived to prevent — and consult other specialized textbooks.

Reviewed by:

Algernon C. Karim, B.Sc., M.Sc., PhD
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Orofacial Pain: Guidelines for As- sessment, Diagnosis and Management

edited by Jeffrey P. Okeson

1996, Quintessence Publishing Co.
Inc.: Chicago.; \$28.00 (US); 285
pages, 8 illustrations
ISBN 0-86715-312-1

The diagnosis and management of orofacial pain is one of the more challenging aspects of clinical practice. In part, this is related to the plethora of etiological and pathogenetic factors involved and the importance of patient symptomatology in the proper categorization of the condition. This soft-cover text was developed by a committee of the American Academy of Orofacial Pain as a guideline for the diagnosis and management of many conditions

that contribute to the development of pain in this region. The work is based on a similar set of guidelines formulated by this group for the diagnosis and management of disorders of the temporomandibular joint.

The book's stated goal, is to provide better insight into the assessment and diagnosis of orofacial pain, but not to be an exhaustive reference text. Somewhat ambitiously, the authors describe the book as "state of the art." It is edited by Jeffrey P. Okeson, who has also authored the 5th edition of *Bell's Orofacial Pains*, which was the subject of review in the April 1996 edition of this journal.

The present volume lists a committee of 13 contributors including 11 dentists and two physicians. It is divided into 10 chapters and begins with an introduction to the methods used to assess orofacial pain disorders. It provides a complete list of the modalities used to diagnose diseases of the face, but the descriptions are rather short. This was clearly the intent of the authors at the outset. Some testing modalities, such as thermography and vibration analysis, are described in detail, but have limited value in clinical practice. There is a discussion of the classification of headache and orofacial pain, much of which is presented in tabular form. The classification system used is derived from the group's earlier treatise on temporomandibular joint disease.

Four rather short chapters follow, describing the differential diagnosis and management of vascular, neuralgic and odontogenic pain. It is admirable to note that odontogenic pain is included since its importance in clinical practice cannot be over-emphasised. The coverage of other important causes of facial pain, including atypical odontalgia, atypical facial pain and trigeminal neuralgia, are brief.

By contrast, there is a long chapter on temporomandibular

joint disorders (TMD) that occupies 113 of the book's 285 pages and includes a list of 742 references. It is difficult to believe that all of these references are required for a text that is intended to be an overview of the subject. A more selective listing would perhaps have been more appropriate. The chapter ends with a short discussion of future research areas, and a not so novel comparison of surgical and non-surgical management of TMD.

The book concludes with two short chapters dealing with pain at various other anatomic sites and pain caused by various mental disorders including hypochondriasis and factitious disease.

In general, the book has a number of strong features. The section on TMD is long but well-written. Aside from the issues related to the reference list in the TMD section, the text is generally well-referenced, citing a large number of contemporary publications. The discussion of conditions based on etiology is important since it provides a biological basis for therapy. However, as with all multi-authored texts, this book suffers from the problems of inconsistent writing style and of large tracts of information that are repetitive and inconsistent across chapters. In addition, the practise of not indicating chapter authorship in a multi-authored text does not inspire confidence when there is so much variance in content and style throughout.

In summary, this will be a useful addition to the library of the specialist treating these conditions and may be of interest to general practitioners who are interested in learning more about the many conditions that contribute to symptomatology in this region.

Reviewed by:

Richard C.K. Jordan, DDS, Dipl.
O. Path., M.Sc., PhD, FRCD(C)
Oral pathologist, assistant profes-
sor, Sunnybrook Health Sciences
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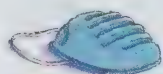
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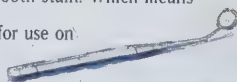


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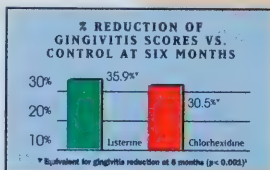
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¹ Gingivitis was evaluated using the Modified Gingival Index.

² TM Warner-Lambert Company Warner-Wellcome Inc. use Scarborough, Ontario M1L 2N3.

³ Overholser CD et al. Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. *J Clin Periodontol* 1990;17:575-579. [PAAB]

⁴ DePaola LG et al. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol* 1989;16:311-315.

⁵ Data on file, 1995.

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B

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Ingrédients actifs: 0.1% Chlorhexidine, 0.1% Parachlorophénol.

Use: 1 L of solution per 1000 ml of water.
Utilisation: 1 L de solution par 1000 ml d'eau.

Concentration: 0.1% (1000 ppm).
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Active ingredients: 0.1% Chlorhexidine, 0.1% Parachlorophenol.
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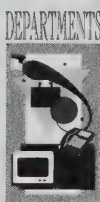
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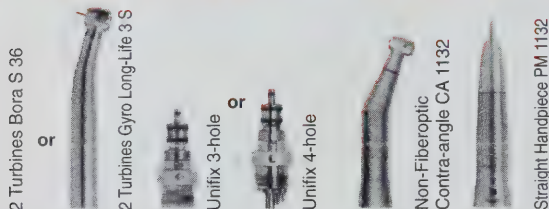
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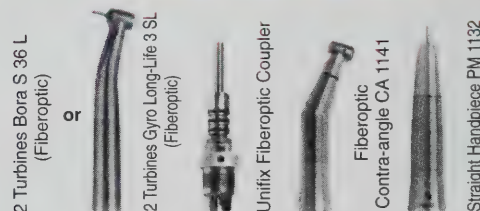
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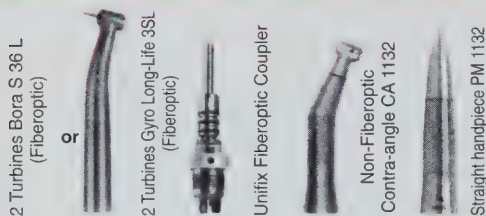
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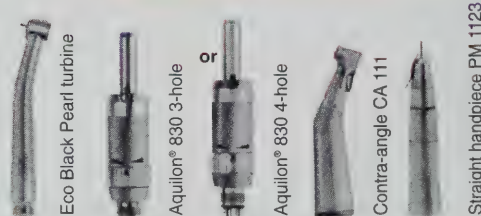
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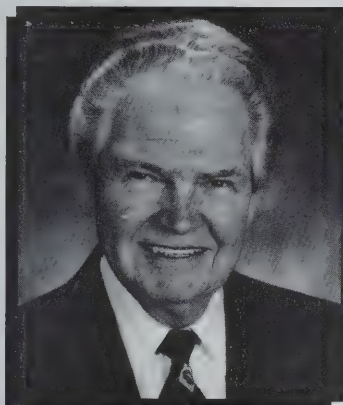
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EDITORIAL

PLAIN WORD



Dr. P. Ralph Crawford,
editor

For a number of years, CDA, along with 21 other national health care associations, has participated in the Canadian Public Health Association's (CPHA) committee on national literacy and health program.

The goals of this unique program are to promote clear verbal communication between health professionals and the people they serve, as well as to distribute health information material written in plain language.

In September, several of us CDA folks attended a reception to celebrate the launch of CPHA's latest initiative to bring linguistic clarity to the health care professions, *Plain Word*. A language game, *Plain Word* was developed to counteract the stark reality that 42 per cent of Canadians have low literacy skills. It is intended as a tool to help health care professionals use plain, easily understandable language in their oral and written communications with patients.

Plain Word is simple and fun to play. All a contestant has to do, within a limited time, is come up with a plain word that corresponds to the hard word written on the selected game card. For example, players could use the plain word *make* to replace the hard word *manufacture*, or the plain word *use* in place of the hard word *utilize*.

I wish more dentists could have attended the launch of CPHA's *Plain Word* game, and heard the same frightening statistics that I did. With the rapid advances being made in communications technology and education, it's hard to imagine that 42 per cent of Canadians have difficulty reading and writing even simple sentences. Or that nearly half of our patients have some degree of difficulty in understanding what we are trying to tell them about their oral health.

Despite popular misconceptions, the Canadians with low literacy skills are not all recent immigrants to Canada, they are not all poor, and they are not all slow learners. In fact, they come from every segment of society, crossing all lines of age, education and social status.

The widespread nature of the problem is actually what prompted CPHA to give so much emphasis to their national literacy program. We health professionals, quite frankly, have a poor track record when it comes to patient communication.

Several examples that graphically illustrate our less than stellar communication skills came to my attention in recent weeks. One patient contacted CDA asking for an explanation of the treatment she was scheduled to receive during an upcoming dental appointment. All the patient knew was that she was going to have an apicoectomy and retrofilling of a front tooth.

You clearly don't have to be in the 42 per cent with low literacy skills to be confused by that treatment plan. I'd be surprised if one Canadian in 10 knows what an apicoectomy is. So I'm not surprised that this patient's first question was, "Does that have something to do with a root canal?"

When we inquired why the patient had not asked her dentist to explain the procedure, she replied that he seemed rather in a hurry, and had left it up to the assistant to go over the details. Apparently, the assistant didn't do a very good job.

Another example came directly across my own desk. An elderly gentleman, who has done a pretty good job of maintaining his teeth through the years, needed two up-

per teeth extracted, followed by the placement of a five-unit bridge. I'm not sure what kind of explanation the patient received at chair-side, but I did see the estimate that was handed to him at the reception desk.

The estimate was basically a computerized statement, with the hand-printed words "Estimate Anterior Bridge" scrawled on the top half of the page. It listed three "ceramco abutment + lab" and two "ceramco pontic + lab" procedures, accompanied by a dollar figure totalling almost \$2,500.

If you had not had the benefit of four years of dental college, I'm guessing that you would have been just as confused as the gentlemen in question. And to add insult to injury, the patient did not really understand why two of his teeth had to come out, and he had no idea how the resulting empty space would be filled between the date of the extractions and the insertion of the completed bridge.

Speaking of four years of dental college, I partly blame our dental education system for our inclination to talk above our patients' level of understanding. Perhaps things have changed since my own college days in the early 1960s, but I distinctly remember being chastised because I called a denture a dental plate. My instructor's words still ring loud and clear to this day.

"Mister Crawford, this prosthesis is a denture. Patients eat off plates not with plates!"

And what about gingival curettage and root planing? If these don't confuse and confound a dental patient, I don't know what will.

Galen, the most outstanding physician of antiquity after Hippocrates, seems to have known more about plain language 18 centuries ago than we do now. In his treatise *On the Natural Faculties* he advised his readers, "The chief merit of language is clarity, and we know that nothing detracts so much from this as do unfamiliar terms."

P. Ralph Crawford, BA, DMD
Editor of the *Journal of the Canadian Dental Association*

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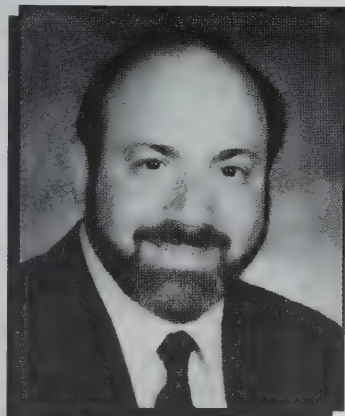


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PRESIDENT'S COLUMN

JOIN THE TEAM



Dr. Barry Dolman,
CDA president

Dentistry is poised to enter a brave new world, where instant communication and rapid technological change will be as much a part of dental practice as the basic amalgam restoration is today.

Used appropriately, the technological changes sweeping through the profession will ultimately prove to be a boon to both our patients and ourselves. Lasers, intraoral cameras and digital radiography all have their place in dentistry.

Instant communication, as the CDAnet system has already demonstrated, also offers many advantages. And the Internet has opened new avenues for clinicians around the world to consult with one another on all aspects of dentistry. This is clearly a positive development.

Unfortunately, the so-called information highway has also created the potential for third-party organizations to engage in data collection and sophisticated profiling. And at least one managed care company is attempting to create a Wide Area Network, or WAN, so that it can diagnose patients and recommend its own treatment plans.

Based on my conversations with dentists across the country, I think it's fair to say that many of us are still mired in the communications Dark Ages. We have

watched our teenage children surf their way around the Internet with ease, but haven't bothered to learn how to program the family VCR.

This has to change. Like it or not, we have to collectively jump onto the communications band wagon, and take advantage of every means at our disposal to deliver dentistry's key messages to our patients and other dental health stakeholders.

I can assure you that government and industry are already on the information highway. Both have the skills and the tools to exchange ideas and gather information, and they're prepared to use them.

All of us should be concerned when the vice-president of Aetna, which is currently attempting to build a national managed care network in Canada, states that dentists and the dental profession "are ripe for the picking."

We cannot afford to live in isolation any longer. If we are going to preserve the independence of our profession, and our ability to provide optimal oral health care to our patients, we must communicate with the public by every means at our disposal, and make Canadians fully aware of what they stand to lose if cost-control managed care plans become a full-fledged reality in this country.

CDA can't do it alone. We're calling on each and every one of you to get involved. Talk to your patients and your contacts in business, government and industry about managed care, and tell them what's at stake. Participate in your local study club and your provincial dental association, and encourage your non-member colleagues to join their national dental association.

It's a cop out to write the president of CDA — as more than a few dentists have done lately — and say that you won't join your national association just because a *Communiqué* article didn't suit you, or you didn't like where the Convention was (or wasn't) held. Particularly when you consider

what CDA has done for you and your profession lately: from spearheading dentistry's successful campaign against the taxation of employer-sponsored dental benefit premiums for three years running; providing sound management throughout the amalgam issue, which resulted in dentists and patients maintaining their control over the selection of restorative materials; to formulating key strategies in dentistry's fight to preserve and enhance Canada's oral health care delivery system.

I have one very simple message for all the non-CDA members out there: Stop sitting in the back seat and taking advantage of the free ride. If you really care about your profession and its future, it's time that you paid your fair share of the bill.

Trust me, the managed care companies seeking to bring discount dentistry into Canada — and to wrest control of treatment planning away from dentists and their patients — have millions of dollars in their war chests, and they are already spending money hand over fist to market their products.

CDA has taken quick action to combat this threat. Our new site on the Internet will allow us to communicate instantly with the public and dentists on key issues, including managed care. And our new department of practice management support services has already made rapid progress on the managed care front.

We are changing with the times, and we're looking at how we can work more effectively with our provincial partners to accomplish dentistry's ends.

In short, we are in an excellent position to steer dentistry into the 21st century. But we can't do it alone. We need you to get involved, we need your membership support, and we need you to communicate with your patients on our behalf.

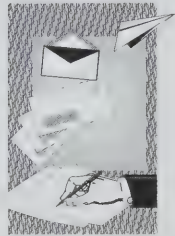
Join the team. Together, we're a powerful partnership.

Barry Dolman, DMD
President of the Canadian Dental Association

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LETTERS



What Is The INR?

We write in reference to the article, "What is the INR?," published in the May issue of the *Journal* (Troulis, M.J., Head, T.W. and Leclerc, J.R. 62:428-430, 1996). Dr. Troulis and colleagues should be commended on presenting a good review of a timely issue that requires clarification and dissemination to the dental community. Knowledge of this issue by the dental practitioner enables proper communication with physicians and management of patients with therapeutic or pathologic bleeding tendencies.

A few points in relation to the management of patients with elevated INR needs to be expanded, however. The authors state that, in their clinical experience, extractions can be performed on patients whose PT ratio is less than 1.5 to 2.0 times control, implying the INR should be less than 1.5. This is misleading, since an INR of 1.5 does not equal a PT ratio of 1.5.¹ The empirically deduced figure of 1.5 times normal has never been thoroughly tested and has been arbitrarily chosen in numerous studies originally attributable to Kay.² It must be emphasized that INR should only be used for patients who are on stable oral anticoagulant therapy, it is not valid for patients with hemostatic disorders, and is erratic when coumadin is started and stopped.³ It is for this and several other reasons that a more sensitive test for monitoring oral anticoagulant therapy may be forthcoming by measuring the native prothrombin antigen.⁴

Unfortunately, the authors recommend hospitalizing patients whose INR is greater than 1.5 and heparinizing them in order to perform minor oral surgery. This procedure is complicated, lengthy and cumbersome for the patient and surgeon, and an unnecessary cost for an already strained health care system. It has been associated with the precipitation of some thromboembolic episodes.⁵ Over the past 15 years, there has been an abundance of research indicating that these patients can be safely treated without modifying their coumadin dose and avoiding admission to hospital.

At our institute, we work extensively with one of the country's large cardiac centres. For the past seven years, we have been treating most of our patients on coumadin as outpatients. With the use of local measures (topical hemostatic agents)^{6,7} or with topical or systemic antifibrinolytics,^{8,9} the requirement for hospitalization can be avoided. We have successfully treated patients with INR values of up to 3.5 and some studies have treated patients with INRs of up to 4.0⁹ without reversal. Furthermore, most physicians are not cognizant of the methods used to treat and avoid reversing patients on coumadin in the dental setting. It is up to us to share and communicate with them these new advances in our field.

Apart from their recommendation of hospitalizing patients, we congratulate the authors on a terse and accurate explanation of INR, since it is the new standard by which patients on coumadin are monitored.

Nick F. Katsikeris, DDS, D.Dent.
Marco F. Caminiti, B.Sc., DDS
Department of Oral and Maxillofacial Surgery
Toronto Hospital

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Authors' Response

We thank Drs. Katsikeris and Caminiti for their comments. We appreciate this opportunity to clarify two of the points in our article.

It was not our intention to imply that an INR of 1.5 is equal to a PT ratio of 1.5. We wanted to point out that many physicians have empirically advised the use of an INR of 1.5 as a safe level of anticoagulation at which to perform dental extractions. However, if one has been following the previous (empirically derived) recommendations of using a PT ratio of 1.5 - 2.0, then a rough estimate of the INR would imply that one has been extracting teeth at INRs much higher than 1.5.

With regard to the recommendation for hospitalization and heparinization of some patients, we agree with Drs. Katsikeris and Caminiti. This is an expensive procedure with attendant risks and is,

to a great extent, probably not necessary. However, at the present time it is a widely used protocol. We are aware of the literature which supports the use of local measures for post-extraction hemostasis in patients who are anticoagulated with Warfarin. However, some uncertainty exists due to the methodology of the currently available studies. We feel that further studies are required before routine use of newer protocols can be recommended. These studies should be prospective, controlled studies, rather than case series, and should use the INR to document the level of anticoagulation.

Timothy W. Head, DDS, M.Sc.,
FRCD(C)

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Jackie Boisvenue, Media Relations Secretary, USC Canada

Le programme des jeunes dentistes

Dans la livraison de juillet 1996 du *Journal de l'ADC*, on pouvait lire, dans la section consacrée au congrès d'août tenu à Montréal, qu'un programme d'une journée était organisé à l'intention des jeunes dentistes.

Cette initiative des organisateurs est excellente et elle doit être louangée.

Permettez-moi de suggérer qu'à un autre congrès on consacre une journée aux dentistes âgés (dont je suis); cette journée serait composée de communications qui illustreraient le passé de la profession: des dentistes à la retraite seraient ainsi portés à participer aux congrès.

Gérard de Montigny, DDS
Université de Montréal

(Editor's Note: Dr. de Montigny was the French editor of the *Journal* from 1946 to 1964.)

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DENTAL BENEFITS ISSUES



Patient and Dentist: A Unique Dental Care Partnership

James Gagnon

With the vast amount of literature that has been published on managed care in professional journals and benefits-related magazines, you've likely read a variety of articles about "care management."

Depending on which publication you selected, several of these articles were no doubt written by companies espousing the necessity of either restoring or maintaining the financial viability of dental benefit plans in the interest of the people who pay the associated costs, namely employers, employees, unions and associations.

This is an understandable goal. Canadian employers are becoming more and more concerned about the increasing costs of providing health and dental benefit plans to their employees. But have you ever heard the companies that are out there selling cost control solutions express any concern for your patients' dental health, or show a genuine and sincere interest in working with dentists and the organizations that represent them to find health-based answers to the cost problem?

Despite what some of the managed care companies are saying, the cost problem is not a direct result of increases in dentists' fees. In fact, the cost of preventive dental care has increased at a lower rate than the consumer price index (CPI) in recent years.

Equally important, as stated in CDA's *Code of Ethics*, dentists have a moral responsibility to maintain the quality of dental care in Canada, to guarantee patients access to the dentist of their choice, and to further the patient-dentist relationship, so that care management remains solely in the hands of dentists and their patients. It is unethical for dentists to enter into any agreement that

would have the effect of transferring the responsibility for treatment planning and care to a third party. And it is clearly irresponsible for dentists to even consider transferring this responsibility to companies whose sole aims are to contain costs, to determine the way patients are treated, and to acquire control over the dental profession.

It is frankly difficult to understand why a dentist would want to become involved in an organization that seeks to control the profession, collect management fees and alter the way dentistry is practised — without any concern for your patients' dental health. And that's really what managed care is all about.

It should therefore come as no surprise that most Canadian dentists are saying "no" to discount dentistry. They understand that the patient's dental health is the first priority, and that there are better ways for employees and other stakeholders to overcome their cost-control concerns.

Dentistry has some ideas that could go a long way toward bringing about the cost stability that Canadian employers are seeking. We are meeting with major employers across the country, as well as with employee groups and the insurance industry, to make them aware of our objectives, and of our willingness to work with them in this regard.

CDA and the provincial associations have already developed effective communications initiatives to educate patients and employers about the value of dentistry, and inform them about the pitfalls of buying into the managed care concept. Everyone involved in this effort is fully aware of the role they must play, and the extent to which dialogue and education are vital to

bring about further improvements in the dental health of Canadians. Our goal is to ensure that all Canadians have access to optimal oral health care. We believe that the best way to achieve this, and thereby reduce employee absenteeism due to lack of appropriate dental care, is to successfully manage the cost of benefits, not the quality of care.

Dentists are the first to acknowledge that they must only treat their patients' oral health needs, regardless of the level of coverage available in their patients' dental plans. As a profession, we recognize that dental plans are designed to provide financial assistance to patients, not to supply an inexhaustible source of payment to dentists. We also recognize that an effective partnership with employers, governments, employees, consultants and insurers is the best way to preserve our patients' high level of oral health, maintain our patients' right to visit the dentist of their choice, and manage costs.

Provider networks that curb the dentist's ability to treatment plan or force patients to seek treatment from participating dentists are simply not on. There are clearly better alternatives for controlling costs than the approach these types of plans are attempting to impose. Do you honestly believe that your patients expect you to join a managed care plan, or that you would still be able to guarantee them the best dental care possible?

Whatever they're called, whatever shape they take, however they operate, the managed care companies have found only one way of cutting costs — reducing both dentists' fees and their ability to provide quality oral health care. ■

Mr. James Gagnon is CDA's director of practice management support services.

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IT'S MY OPINION



It's About Risk

Richard Beyers, DDS

On the Sunday morning of Ontario's civic holiday weekend, I settled in early, out on the dock, to read the July issue of the *CDA Journal* (Vol. 62, No. 7, 1996). Perhaps it was the softness of the day: no wind, no waves, still a morning mist. But by the time I'd read the *Journal*, I had developed an attitude. The CDA and Ontario Dental Association (ODA) are diddling while the context of practice — as I know it and like it — burns.

Every article talks about risk. It seems to be dentistry's overused word, like "awesome" is for teenagers or "paradigm" is for gurus. But are we talking about risk that is a hazard or peril, or the risk associated with a daring to undertake? The irony of these articles is that they nibble away at the edge of the peril that dentists talk about in the corner at cocktail parties, when the real risk we are taking is that it may soon be too late.

Let me explain.

The rules of the economy game in Canada and the rest of the industrialized world (in this post-industrial period) remain the same:

- the supply/demand equation;
- profit as the measure of success; and
- competition (now globally) as the check/balance that motivates suppliers to provide value and quality.

Global competition has cut incomes and disrupted the lives of thousands of Canadians. As the door to the dental office swings open, every person passing through it has felt the effects of the changing economy — except perhaps the established dentist.

It is well-known that the supply of dentists and dental hygienists is greater than ever. It is also known that the epidemiology of dental disease indicates a 60 per cent decline in dental caries and a significant decline in periodontal disease (measured as threatening premature tooth loss). So with more supply and less demand, the calculation should favor the patient by providing more and better service at reduced costs.

On the other side of the coin, however, it is known that the practise of dentistry is very profitable (investment brokers pester us relentlessly for a reason). It is also known that when third parties pay, the patient suspends his or her usual critical judgment of the value, quality, and necessity of the treatment he or she receives.

The bean counters know that, every year, a greater percentage of a dentist's income is derived from patients with dental coverage — not by providing for more patients, but by providing more services to covered patients. In the process, the boundaries have shifted: a pris-

tine tooth now needs fluoride and sealants; a modest defect now needs an onlay to prevent a cracked cusp; a mild pulpitis now needs a root canal treatment and a crown; and a bony periodontal defect needs three procedures, osseous surgery, allo-graft, and guided tissue regeneration, each billed as a separate procedure though done concurrently (triple-dipping).

Although patients with dental plans receive abundant care, the disease spread between these well-treated patients and those without dental plans is narrowing. The public dental health officers and the health economists decry the wasted resources that could be spent to fight the remaining dental disease in our society: in the elderly (especially in collective living centres) and the working poor. But as the social goal of curing dental disease and saving teeth diminishes, the means-to-an-end procedure becomes that of separating the benefit providers from their money and celebrating professional success by profit alone.

Consider Speer's article in the July issue (pp. 563-565), published under the banner Dental Ethics, and titled "Confidentiality at Risk." He constructs a legal argument with just a couple of thin legal precedents, but no foundation. Information necessary to third-party payers is really supplied to the pa-

tient (though, with consent, the conduit may go directly to the payer) for the patient's economic benefit. The patient may withhold the information and forego the benefit. If the patient takes issue with the confidentiality aspects of the dental benefit contract, then it's his or her issue to deal with either individually or through the employer, union, or association. The risk to the dentist is that being compelled to provide more information takes time, for which there is no reimbursement. Similarly, the risk to the dentist who provides only covered services is that this information is used to limit or decline reimbursement. Confidentiality and ethics be damned. This article is about gathering information that puts dentists at risk of reduced income.

Consider Dr. Ten Cate's Letter to the Editor (Oralife, pp. 539-541), along with the President's Message from June (Brookfield, James R. Oralife Managed Care Plan Is A No Go. 62(5):389, 1996) and his subsequent President's Letter on the same topic. Dr. Ten Cate says that Oralife has set out to persuade insurance carriers to expand coverage for high-risk patients. Is there a dentist who needs a test to diagnose high risk for caries and periodontal disease? The Oralife tests are objective information that bypasses the subjectivity of the dentist, who both diagnoses and delivers the care, and the entitlement bias of the patient, who may like frequent scaling and polishing. Does anyone really believe the success of Oralife depends on the few high-risk insured patients? Or, for that matter, does anyone believe Oralife can compete with giants like Colgate at selling fluoride, or Rhone-Poulenc at selling metronidazole, or Proctor and Gamble at selling chlorhexidine products?

Oralife is in the information business. The GO (guaranteed outcome) program will build a database of great value to the benefit providers in their quest to subject the cost of covered dental care to the same down-sizing or right-sizing constraints as are occurring in the rest of the economy. This model seeks to separate the aspect of dental health care that controls disease from the part that enhances well-being. Pre-

sumably, employers can contain their dental benefit costs, as well as their image of being concerned, enlightened types, by agreeing to cover the disease component only. High disease risk be damned. Oralife's approach provides a sure bet to reduce costs, at the risk of reduced income for dentists.

Consider the article by Leake et al. on "Developing Guidelines" (Report on the RCDSO-CDHSRU Workshop On Developing Clinical Guidelines/Standards of Practice. 62(7):570-577, 1996). Its first point addresses "potential risks and costs." Then it defines the exercise as developing "guidelines that describe the process of care, which are issued by an authority for the purposes of providing a benchmark by which care is judged." Is this what the public really wants? In every survey conducted by our associations, the public has said that it is very satisfied with the process of dental care. What the public wants is less cost. They want less cost per service, or some means of putting an outcome value on the services offered by dentists (some of whom market like door-to-door vacuum cleaner peddlars), so they can decide to accept or refuse the proposed dental care. In many cases, this value is established indirectly by the benefit plan agreement, because the patient determines that the services covered by the plan have value, while those that are uncovered do not. Information about outcome benefit is the need, containing costs is the objective. Process be damned. Information about outcomes will lead to reduced incomes for dentists.

The social context in which we practise (in Ontario) is interesting. Physicians, for example, are on the other side of the supply/demand equation. With absolutely no marketing (plastic surgeons excluded), the demand for their services exceeds supply. If they work 70 hours a week to reap the profit, they hit a cap and their reimbursement is curtailed. They want to be able to get out from under single-payer government insurance and compete for the public's discretionary dollars. The dental profession, on the other hand, led by CDA, seems to be going

in the other direction. It begged and cajoled the federal government to continue the favorable tax status that sustains dental prepayment. When it was successful, everything was right with the world.

Dentists are the human equivalent of a garbage bear. When we're hooked on the easy and abundant source of sustenance, we lose our instincts for survival. We are prepared to risk the context of our professional lives rather than moderate our soft and greedy existence. The growing segment of our society with multiple part-time jobs, and no dental plan, cannot afford our fees. And while it is true that the growing segment of society that is elderly, especially those in collective living centres, have teeth, thanks partly to us, many have limited access to dental care. Although we have excess hygiene capacity to do the job, we are not developing a workable caregiving system that will provide the regular and continuous dental hygiene care needed to maintain the elderly's mouths at an affordable cost.

The characteristics that define the context within which we practise remain:

- a close patient-dentist relationship;
- fee-for-service reimbursement;
- celebration of the craftsmanship inherent; and
- a high degree of autonomy moderated only by the dental regulatory authority.

We are vulnerable because of the supply-demand situation, our lack of diversity, and our comfort — we are risk-adverse. We are also vulnerable because the engine of the new economy, "information technology," has noticed us and believes that the analysis and packaging of information about our conduct is a cost-containment source for them and their plan sponsors. Their savings will be at our expense.

Most important, the context of our practice will change. And when it does, it will never return. Managed dental care models of all sorts are ready and waiting to be imported from the United States.

Indeed, Oralife has developed a made-in-Canada model.

We have two choices.

One, we can carry on as we are, greasing the slide to avoid the slivers, but ignoring the public's economic bottom-line agenda. The result will be a new context (managed care, managed costs, whatever), within which most of us will be practising, and a reduction in our incomes. It's a "lose-lose" deal that will commit our profession for the foreseeable future.

Or, two, we can pre-empt these schemes by voluntarily reducing some of the excessive fees (it's just a guide) for such things as composite restoratives, preventive services, periodontal scaling, and pontics for bridgework. Society is trying to find its way between one economic era and another. If the fee guide is to continue to be used by the benefit providers as a baseline for reimbursement, the profession must demonstrate a societal conscience by devising an enlightened process of fee review. Lower

fees are appropriate at this time. A "lose-win" deal will result: our incomes will be reduced, but the context of our practices will remain the same.

Let's take a risk and put some chaos into the system. Who knows what new values may emerge for the public to acquire from us, what new relationships will be forged with enlightened for-profit businesses (like ourselves), but within our context of practice, not their's. Let's forget about government. In the foreseeable future, it's a debt-ridden eunuch. Think about why Oralife was able to pull together such a cadre of highly-published academics for its First Annual International Consensus Conference on Dental Risk Assessment and Disease Management. Although each of them has access to major dental journals and influences the policies of a major dental school, they chose to associate their reputations with an information technology business. They want to be seen to be relevant in this information age.

Lastly, consider Drs. Brandon's and Waters's article, "Dentists at Risk: The Ontario Experience" (62(7):566-567, 1996). Lifestyle diseases and untimely death emanating from unresolved stress are serious issues. This article is about the exceptions to the rules of the economy. If you have tried to buy happiness and couldn't, try something else. If more income didn't help, perhaps less won't hurt. Take a lesson from the corporations. If you feel like middle management, squeezed from both sides, give yourself a golden handshake. Make that lifestyle adjustment and let the young dentist who replaces you work out solutions for the future. ■

Dr. Richard Beyers is a former president (1990-1993) of the Royal College of Dental Surgeons of Ontario. He maintains a private practice in Kitchener, Ontario.

The views expressed are those of the author, and do not necessarily reflect the opinions or positions of the Canadian Dental Association.

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CDA Launches Web Site



Miss Linda Teteruck, director of communications

CDA has officially launched its site on the World Wide Web.

Starting this month, dentists and interested members of the public can visit the association's Internet site to obtain in-

formation on CDA and the key issues it manages on behalf of Canadians and the dental profession.

The site will also contain CDA's policies, guidelines and positions, as well as information on dental education in Canada, the Consumer Products Recognition Program and other important programs of interest to dentists.

"CDA's Internet site gives members instant access to their national association," said CDA president Dr. Barry Dolman. "It will not only allow dentists to stay informed about what CDA is doing on their behalf, it will open the door for them to communicate with us electronically, by e-mail, to request information from the CDA Library on-line, or to order specific materials, such as the

Dental Services Agreement or our *Taking Care of Business* program.

"It's also a quick and easy way for the public to get a grasp of what CDA is all about, and a wonderful tool for us to promote the value of dentistry to millions of Canadians. I'm very pleased that CDA has a presence on the information highway. Our site will prove to be an invaluable communications tool as we gear up for the campaign against managed care, and continue to voice our strong opposition to the taxation of employer-sponsored health and dental plan premiums."

In addition to information on key issues, CDA's Internet site will provide the public with a full range of dental awareness material, including dentistry's five-point prevention plan, and tips on what to do in a dental emergency.

"It's been a long haul to get the site up and running," said CDA's director of communications, Linda Teteruck, "but we wanted to make sure that we had something unique to offer to our members and the Canadian public. Now our challenge will be to keep the material on the site fresh and interesting."

Dentists interested in visiting CDA's Internet site for themselves can connect to the association's home page at: <http://www.cda-adc.ca>. ■

supplementary health and dental coverage."

Based on research that W.M. Mercer Ltd.

conducted on behalf of CDA and its partners in the Action Plan Committee For Fair and Supportable Tax Treatment last year, 3.6 million Canadians are currently ineligible to claim a tax deduction on



Dr. Barry Dolman, CDA president

the cost of their dental care. This group includes 1.08 million unincorporated, self-employed individuals and their dependents; 570,000 Canadians who are either unemployed, not attached to the labor force, or not covered by a special government program; and 1.95 million workers who are eligible for coverage, but are not in an employer-sponsored health and dental plan.

"Extension of the current exemption to unincorporated, self-employed Canadians would be a significant step forward," said Dr. Dolman. "This action would send a clear signal to Canadians that their national government has no plans to place a tax on health."

As highlighted in CDA's 1996 brief on the tax issue, *Affordable and Accessible Oral Health Care for Canadians: Worthy of a Step Forward*, recent research has shown that Canadians with access to tax-exempt dental plans have fewer decayed teeth, fewer missing teeth, more sound teeth, and a much higher percentage of healthy gums. These figures reflect the fact that adults with dental coverage visit their dentist more often than those with no coverage, and generally receive more frequent preventive dental care.

"The government's decision to support the provision of tax-exempt dental benefits to employees has proven to be among its most effective health measures. It has served to increase access to dental care, it has encouraged Canadians to seek

Good News From Finance Committee

CDA got some good news on the taxation of employer-sponsored health and dental plans when it appeared before the House of Commons Standing Committee on Finance October 23.

At the conclusion of CDA president Dr. Barry Dolman's opening statement, committee chairman Mr. Jim Peterson voiced strong support for CDA's position that the current tax exemption on health and dental plan premiums should be extended to unincorporated, self-employed Canadians.

"I don't believe that the members of this committee wish to

change their opinion from last year," said Mr. Peterson.

He reiterated the same sentiments in his closing remarks at the end of the hearing, saying that the committee has supported the extension of the deduction on health and dental plan premiums to unincorporated, self-employed Canadians in the past, and he believes that it will continue to do so in the future.

"Because that is where the equity lies," he said.

In its 1996 report to Finance Minister Paul Martin, the committee recommended that the "government examine the possibility of allowing self-employed, unincorporated individuals to deduct the premiums of

treatment on a timely basis, and it has resulted in dramatic improvements in the oral health of Canadians ...," said Dr. Dolman.

"Moving forward to extend the existing health and dental plan exemption to unincorporated, self-employed Canadians is an appropriate and affordable action to take at this time. It is the right way to go, and CDA hopes that this committee will again urge the minister of finance and the government to examine such an extension. We believe it is an appropriate action, because it will bring a positive end to an inequity in the current applicability of our tax law and regulations."

The Finance Committee's final 1996 report will likely be released in early 1997. Full details will be provided in the *Journal* and *Communiqué* when they become available. ■

November 20 — National Child Day

Canadians will be asked to show a little extra understanding and respect toward children and young adults November 20, during National Child Day.

Promoted by the Canadian government since 1993, National Child Day was established to recognize that Canada's youth and children deserve to be valued and respected.

The day is held November 20 to coincide with the anniversary of two significant historical events, the adoption of the United Nation's Declaration of the Rights of the Child in 1959, and its Convention on the Rights of the Child in 1989.

During National Child Day, Health Canada's childhood and youth division will be reminding all Canadians that a happy childhood is made up of countless small words and gestures that tell children and youth they are important in their own right, and valued members of society. Canadians can show they care in many ways — by giving their children a hug and a word of encouragement, by talking to them and listening to what they have to say, by showing them understanding and respect, and by encouraging them to get actively involved in society. ■

About Infection Control

Millions of Americans routinely ignore what may be the world's best piece of infection control advice: Wash your hands after you go to the toilet.

Researchers participating in a study sponsored by the American

Society for Microbiology and the Bayer Corp hid in toilet stalls or pretended to comb their hair while observing the washroom hygiene practices of 6,333 men and women in five American cities. They found that only 61 per cent of men and 74 per cent of women wash their hands after using the toilet. ■

Dental Benefits Issues Committee Adopts Strategic Principles

CDA's joint committee on dental benefits issues has adopted a set of eight strategic principles and a communications action plan in response to the managed care issue.

Both the principles and the plan will be presented to CDA's board of governors in March. If they are approved, they will set the tone for dentistry's campaign to prevent so-called fourth and fifth generation cost-control-based managed care plans from gaining a foothold in Canada, and establish three "streams of action" for the profession to follow in the dental benefits area.

The committee adopted the principles and plan during its September 20-21 meeting in Ottawa.

Most notably, the principles identify the two types of managed care plans "against which dentistry must draw lines and take stands in defence of professional integrity and credibility," as well as those that the profession believes are acceptable from a patient-health perspective.

"Acceptable managed cost programs include traditional employer-sponsored dental plans, which typically incorporate such cost-limiting provisions as annual maximums, co-payments, and/or deductibles," said committee chair Dr. John Diggins. "Dentistry has lived successfully with these types of plans for years, because they do not interfere in the dentist-patient relationship, or put our patients' oral health at risk."

The unacceptable types of plans, as described in the third guiding principle, include contracted service plans "wherein cost control crosses the traditional plan line and goes to an extreme



Dr. John Diggins, chairman of the joint steering committee on dental benefits issues

which risks jeopardizing the delivery of high-quality care."

In essence, these plans "promote discount dentistry," and effectively prevent patients from visiting the dentist of their choice.

Similarly, the principles state dentistry's strong opposition to plans that "cross the line from cost control into attempted treatment control and intrusion into the dentist-patient relationship."

However, the principles also recognize the need for cost-effective fee-for-service plans that maintain quality dental care, and state that dentistry should work with amenable dental benefits stakeholders to achieve this end. In addition, they call on the profession to consider the human resources issue in its responses to managed care.

Over the next few months, CDA's director of practice management support services, Mr. James Gagnon, will prepare a study paper on alternative dental care delivery systems. The intent is to identify plan structures that will allow employers to control the costs of providing benefits, and increase the access to optimal oral health care for Canadians.

The paper will be discussed by the committee at its next meeting. ■



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Ukraine Emergency Rescue Service Seeks Support

Dentists from the Emergency Rescue Service in Kharkiv, Ukraine, are looking for donations of used equipment, instruments and supplies.

A non-governmental organization, the emergency service was created through the initiative of a group of volunteers who joined in a rescue mission to Armenia in 1988, to help the country deal with the consequences of a major earthquake.

The service, which now has 18 employees, assists and unites the volunteers who offer rescue assistance during natural disasters and other extreme situations.

For more information on the service, or to make a donation, call Alexandra at (613) 744-7737; or Lena at (613) 526-2439. ■

APPOINTMENTS

Montreal Dental Club Names New President

The Montreal Dental Club, founded in 1897 and one of the oldest dental clubs in Canada, has announced its new executive board.

Dr. Mike Percio will serve as president for the 1996-1997 term. Also serving on the club's executive are: Dr. Jeff Erdan, president-elect; Dr. Sam Sgro, past-president; Dr. Tony Chénade, vice-president; Dr. Roy Foster, treasurer; Dr. Bryan Tremblay, secretary; and Dr. Leo Moran, historian/archivist. ■



Dr. Mike Percio

Canadian Academy Of Pediatric Dentistry Elects Officers

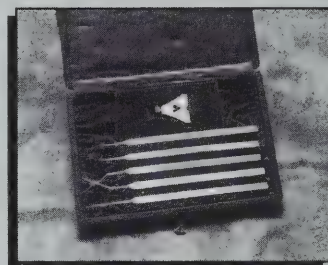
The Canadian Academy of Pediatric Dentistry (CAPD) elected a new slate of officers during its 1996 scientific session and annual meeting, held from September 6-8 in Halifax, Nova Scotia.

WHAT'S IT?

Sincere thanks to Dr. Anne Dale, of the University of Toronto's faculty of dentistry, for her help in identifying the *What's It?* described in the September 1996 *Journal*. Dr. Dale kindly sent us a 1928 article entitled "Treatment of the Periodontal Pocket," which was published by Dr. Harold Keith Box in the University of Toronto Press. The article not only explains the use of the curettes, but also clears up the mystery of the name "Platt" and the use of the triangular device accompanying the kit of scalers.

The set of Box Cemental Curettes in the velvet and leatherette case is associated with Dr. Box, who is often referred to as the father of dental research in Canada. E.C. Platt was the co-designer and maker of the instruments; and the triangular device was used to hold the scaler against an Arkansas stone during sharpening procedures.

If you have a dental question or an instrument that needs identification, please write Dr. P. Ralph Crawford, Editor, *Journal of the Canadian Dental Association*, 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6. There is bound to be at least one reader who can help you find the answer. ■



Dr. W.S. Cheung of Vancouver was elected president of CAPD for a two-year term. He will be joined on the academy's executive committee by: Dr. Robert L. Barsky, Calgary, vice-president; and Dr. Murray H. Diner, Montreal, secretary-treasurer. Dr. Lawrence R. Yanover is the immediate past-president and Dr. J. Victor Legault of Montreal continues as the executive director.

The next CAPD annual meeting will take place in Niagara-on-the-Lake, September 19-21, 1997. ■

OBITUARIES

Dr. A. Gerald Racey: Dr. A. Gerald Racey, who served as president of the Canadian Dental Association in 1958-59, died in Montreal in August. He was 88.

Born in 1908 in the province of Quebec, Dr. Racey completed his pre-dental training at Queen's University in Kingston, Ontario. He earned his undergraduate dental degree from McGill University in 1935, and subsequently completed a year of graduate study at Harvard University.

On his return to Montreal, Dr. Racey was appointed a professor in oral pathology at the University of Montreal. He ultimately joined

McGill's dental faculty, and retired as professor emeritus in 1976 following a long career.

Dr. Racey served on the CDA board of governors for seven years prior to his election as president in 1958. During the 1950s and 60s, he was also an executive board member of the National Dental Examining Board and the National Research Council, dental section.

A fellow of both the International College of Dentists and the American College of Dentists, Dr. Racey was a life member of CDA.

Dr. Jack Marshall: Dr. Marshall died on June 26, 1996. He was 92.

A 1929 graduate of the University of Toronto's dental faculty, Dr. Marshall practised in Belleville, Ontario, throughout his career. He represented the third generation of dentists in his family. The Marshalls have provided dental care to Belleville residents for more than 100 years.

At the outset of his practice, Dr. Marshall concentrated on treating children. Later in his career he limited his practice to orthodontics.

Dr. Marshall was active in organized dentistry and was instrumental in starting the Bay of Quinte Dental Society. He was a life mem-

ber of the Ontario and Canadian dental associations.

Dr. Kenneth Epstein: Dr. Epstein died in Saskatoon, Saskatchewan, September 7. He was 83.

Born in Morris, Manitoba, Dr. Epstein was a 1940 graduate of North Pacific College in Orgeon, and served as a captain in the Canadian Dental Corps during the Second World War.

Following his war-time service, Dr. Epstein returned to Eston, Saskatchewan, to practise dentistry. In 1948 he moved his practice to Saskatoon, and continued in private practice until the late 1970s. He then began his next career, taking on a position as a part-time instructor at the college of dentistry, University of Saskatchewan.

A life member of the Canadian Dental Association, Dr. Epstein retired from dentistry in 1983, at which time he entered into his third career as a recognized sculptor of bronze figures.

Dr. Jack Kanee: Dr. Kanee died September 21, 1996. He graduated from the faculty of dentistry, University of Alberta in 1957. Following graduation he established a practice in Regina, Saskatchewan. ■

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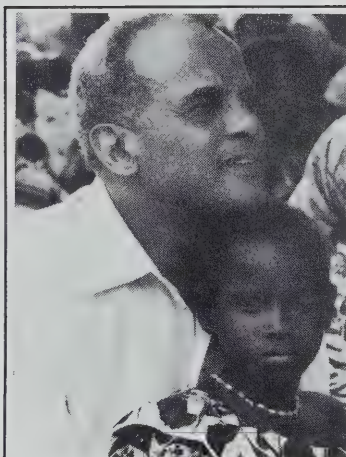
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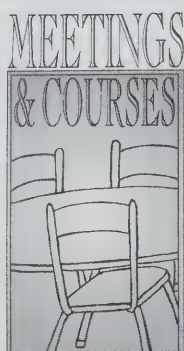
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INTERNATIONAL



December 6-7

Symposium — 20 Years in Periodontal Local Drug Delivery: Current Applications and Future Trends in London, U.K. Contact the Conference Manager (Dental), The Medicine Group (Education), 62 Stert St., Abingdon, Oxfordshire, OX14 3UQ, U.K. Tel.: + 44 1235 555770, or fax: +44 1235 554691.

February 8-15, 1997

Barbados Dental Association Convention. Contact Lynne Brandon (evenings). Tel.: (519) 657-4306, or fax: (519) 472-9120.

February 14-16

First International Meeting of the Egyptian Periodontal Society in Cairo. Special presentation by Professor P.I. Branemark. Contact E.P.S. First International Meeting, c/o Odyssey Travel, 31, Ministry of Agriculture St., Dokki, Cairo 12311, Egypt. Tel.: 202 348 5305, or fax: 202 349 4186, or e-mail: ruodc@rusys.EG.net

February 18-21

International Dental Expo and Conference — Indonesia '97 in Jakarta. Contact the Hong Kong (Asia) Exhibition Co, Ltd., No. 3, 7/F., Kin Tak Fung Commercial Bldg., 467-473 Hennessy Rd., Wanchai, Hong Kong. Tel.: (852) 2591 9823 or fax: (852) 2573 3311.

March 16-23

Caribbean Travel and Learn Cruise: Harmony and Humor for the Dental Team — Dr. Ken Snyder. Sponsored by the University of British Columbia, Vancouver, B.C. Contact Cruise Holidays. Tel.: 1-800-665-6313 (Canada and U.S.A.), or fax: (604) 372-1630.

April 3-7

19th Asia Pacific Dental Congress in Colombo, Sri Lanka. Contact the Congress Secretariat, c/o Sri Lanka Dental Association, 275/75 Baudhaloka Mawatha, Colombo-7, Sri Lanka. Tel./fax: (94-1) 595147.

April 3-5

International Symposium of the Treatment of Edentulous People in Geneva, Switzerland. Contact SYMPORG S.A., 7, Avenue Pictet-de-Rochemont, 1207 Geneva, Switzerland. Tel.: (022) 786 37 44, or fax: (022) 786 40 80, or e-mail: sym-porg@vtx.ch

May 21-25

9th Biennial Convention of the Caribbean Atlantic Regional Dental Association (CARDAs) in Belize City, Belize. Contact the Dental Association of Belize, P.O. Box 1418, Belize City, Belize. Tel.: 501-2-30665, or fax: 501-2-31801, or e-mail: Bennett@btl.net

June 5-7

7th International Congress on Reconstructive Preprosthetic Surgery in Copenhagen, Denmark. Contact the Congress Secretariat, Department of Oral & Maxillofacial Surgery, School of Dentistry, Faculty of Health Sciences, University of Copenhagen, 20, Nørre Allé, DK-2200 Copenhagen N, Denmark. Tel.: +45 35 32 66 11, or fax: +45 35 32 66 25.

June 5-8

1st International Dental Congress Lithuania in Vilnius. Contact VVAA Travel Agency, P.O. Box 8153, 3503 RD UTRECHT, The Netherlands.

June 9-14

73rd Congress of the European Orthodontic Society in Valencia, Spain. Contact the Secretariat, GAMA CONGRESOS, S.A., Recaredo, 31, 46001 Valencia (Spain). Tel.: 34 6 3921311, or fax: 34 6 3912020, or e-mail: gama@ctv.es

June 19-21

British Dental Association National Dental Conference in Bournemouth. Contact the Conference Office, The British Dental Association, 63 Wimpole Street, London W1M 8AL. Tel.: 0171 935 0875 (ext. 286/233), or fax: 0171 486 0855.

June 26-28

Turkish Dental Association's 4th Dental International Congress in Istanbul, Turkey. Contact the Chamber

of Dentists of Istanbul, Cumhuriyet Cad. 361 / 3, 80220 Harbiye, Istanbul, Turkey. Tel.: 0.212. 296 21 05, or fax: 0.212. 296 21 04.

CANADA



December 6

Marketing and Managing for Success. Ontario Academy of Dentistry Course. Presenter: Dr. Howard Glazer. Contact Wendy Maginn or Dr. Stewart Sigismund. Tel.: (416) 323-0101.

December 7

Forensic Identification: An Overview of Advanced Topics in Legal Dentistry — Dr. David Sweet. Contact the University of British Columbia, Continuing Dental Education, Room 105, 2194 Health Sciences Mall, Vancouver, B.C. V6T 1Z3. Tel.: (604) 822-2626, or fax: (604) 822-4835.

December 7

The Alpha Omega Memorial Lecture: Cosmetic Dentistry — New Vistas in Communication. Dr. Ken Neuman. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

January 10, 1997

Facial Pain Management Update, 1997. Speaker: Dr. Parker Mahan. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

January 11

Temporomandibular Joint Disorder. Presenters: Dr. A.K. ElGeneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

January 24

Soft Tissue Management — Non-surgical Periodontal Therapy. Dr. Surinder N. Bhaskar. Contact the Toronto Academy of Dentistry, 902-170 Bloor St. West, Toronto, Ont. M5S 1T9. Tel.: (416) 967-5649, or fax: (416) 967-5081.

February 1

A Review of Common Intraoral Mucosal Lesions in Brandon, Manitoba. Dr. John Perry. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 18

Pharmacology for the Dental Professional. Lecturer: Patrick Mayo. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

February 21-22

Medical Emergencies in the Dental Office. Dr. Ron Boyar. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 28

Excellence With the Most Recent Advances in Endodontics Today. Speaker: Dr. Clifford Ruddie. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 7-8

The Use of Automated Handpieces and Nickel Titanium Instruments in Endodontics. Dr. Carl E. Hawrish and Dr. William Christie. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

March 14

Occlusion and Esthetics — an Oxymoron. Speaker: Dr. Bruce Small. Contact the Calgary and District Dental Society, 76 Hawkcliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 20

Massage Therapy for the Dental Professional. Lecturer: Alisa Casault. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

May 4-6

2nd Trans-Pacific Endodontic Conference in Vancouver, B.C. Contact Dr. Wayne Pulver, 159 Willowdale Ave., Willowdale, Ont. M2N 4Y7. Tel.: (416) 222-9900, or fax: (416) 222-9901.

May 20

Herpes and Hepatitis. Lecturer: Dr. Barbara Romanowski. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

June 19

The Treatment of the Geriatric Patient. Lecturer: Dr. I. Kuc. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

July 27 - August 1

16th International Congress of Nutrition / 16^e Congrès international de nutrition in Montreal, Quebec. Contact the Congress Secretariat, IUNS '97, National Research Council Canada, Building M-19, Montreal Road, Ottawa, Ont. K1A 0R6. Tel.: (613) 993-7271, or fax: (613) 993-7250.

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January 23-26, 1997

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1997 Star of the North Meeting in Minneapolis, Minn. Contact the Minnesota Dental Association, 2236 Marshall Ave., St. Paul, Minn. 55104. Tel.: (612) 646-7454.

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International Association of Dento Maxillo Facial Radiology in Louisville, Ky. Held in association with the **3rd International Congress on Computed Maxillofacial Imaging.** Contact Dr. Neill Serman, Division of Oral Radiology, School of Dental and Oral Surgery, Columbia University, 630W 168 St., New York, N.Y. 10032. Tel.: (212) 305-5674, or fax: (718) 601-6836.

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26^e Congrès annuel de l'Ordre des dentistes du Québec — Les Journées dentaires du Québec in Montréal. Contact Nicole Pagé or Ginette Boutin. Tel.: (514) 875-8511, or fax: (514) 875-1561.

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CLINICAL



Advanced Instant Photography

George Freedman, DDS, B.Sc.

ABSTRACT

With the popularization of cosmetic and esthetic dental procedures, the importance of various photographic techniques has increased. The dentist's choice of a particular system depends on whether the intended use of the dental image is to assist in treatment acceptance, or to use the patient's "initial phase of excitement" to contribute to photomarketing. This paper uses before-and-after photos to demonstrate a dramatic alteration of the patient's smile. Photomarketing may be enhanced through the introduction of instant cameras, including the Polaroid Macro 5 SLR.

SOMMAIRE

La popularisation des procédures dentaires cosmétiques et esthétiques a accru l'importance de différentes techniques de photographie. Le choix d'un système particulier par le dentiste dépend de l'usage qu'il veut en faire, que ce soit pour capter le premier moment d'excitation du patient ou pour contribuer au marketing photographique. Les photos prises avant et après un traitement révèlent un changement spectaculaire dans le sourire du patient. Le dernier appareil à apparaître en photographie instantanée est le Polaroid Macro 5 SLR.

Introduction

As the various cosmetic and esthetic procedures in dentistry have become popularized, imaging techniques, both photographic and electronic, have increased in importance.¹⁻³ Today, patients and clinicians demand visual and esthetic as well as functional acceptability in restorations. Due to the subjective nature of visual criteria, an objective means of collecting and evaluating treatment data is required. The practitioner is in the fortunate position of having a number of visual documentation systems from which to choose.

The objectives of dental photography and imaging range from treatment documentation to peer presentation, and from patient education to direct marketing.⁴ A full range of equipment, including 35-mm cameras, instant cameras (Fig. 1), video cameras, intra-oral video cameras, imaging programs, and a variety of hybrid systems, is available to the clinician. Each of these options is differentiated even further by their level of sophistication and difficulty of operation. The dentist's choice of a particular system depends greatly on the intended use of the dental images.

Slides are currently recognized as the standard format for peer presentation, while intraoral video cameras are the most direct pur-

veyors of in-chair patient education. In today's fast-paced practice environment, however, one of the major concerns of dentists is the efficacy of their internal and external marketing.⁵ The instant print camera provides the most effective means of improving referrals⁶ and increasing patient satisfaction.⁷

There is little question that the most ideal mode of dental advertising is direct unsolicited testimony from a satisfied patient.⁸ The difficulty with this approach lies in the ability of a typical, minimally-communicative patient to become an effective broadcaster of the dentist's skills and techniques. However, this personality conversion has often been observed after a patient has undergone cosmetic dental treatment.

The Initial Phase Of Excitement

The patient's awareness of the positive benefits of an esthetic dental procedure is most acute immediately following the procedure, when the improved appearance is novel and exciting. This is the time when he or she is likely to talk about the treatment to friends, relatives, co-workers, and anyone else who will listen. Since a patient is most likely to interact with like-minded individuals, all the attention is focused on a select and receptive target market. This



Fig. 1: Polaroid Macro 5 SLR.



Fig. 2: Photomarketing with before-and-after instant prints.

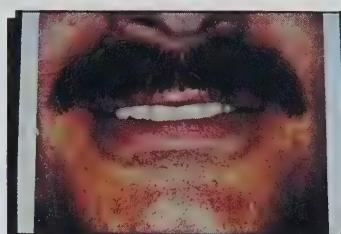


Fig. 3: Life size or 100 per cent magnification.



Fig. 4: Double life size or 200 per cent magnification.

narrow window of opportunity for ideal third-party marketing is termed the *initial phase of excitement*.

Unfortunately, with most patients, this phase dissipates within a week or two, as new life events occur and dental topics fade from the conversation. Thus, for maximum referral success, it is very important for the dentist to harness this initial phase of excitement.

It is the dentist's responsibility to provide the patient with as much informational ammunition (verbal, written, visual) as possible. The more communicative the patient, and the better his or her capacity for clearly demonstrating the benefits of the treatment, the more likely are his or her friends to seek dental treatment.

Not all patients are equally adept at accurately describing the transformation that has been created by the cosmetic dentist. As laymen, they lack the terminology and experience to be effective marketers. For maximum benefit, the practitioner should provide these willing ambassadors with pamphlets and pictures that visually document the esthetic changes.

A written pamphlet is likely to be accurate and informative, but the likelihood of it being read by many in today's visually-oriented setting is slim.

Arming the patient with before-and-after photographs following treatment provides a visually-centred, personal, comprehensible, easily talked-about, and dramatic documentation of the dentist's skills⁹ (Fig. 2). A single glance at the comparative pictures may encourage potential patients to seek appointments. Positive personal testimony from the patient, combined with a visual confirmation, converts word-of-mouth advertising into seeing-is-believing proof.¹⁰

Photomarketing

The dentist may choose to photomarket using one or more of several different types of pictures: slides, 35-mm prints, and instant prints. Slides, while technically excellent, require projectors and screens, and are thus not readily suited to quick and easy demonstration. Similarly, although 35-mm prints can be readily transported and shown by the patient, the various steps involved in the photofinishing process are likely to cause delays beyond the point of usefulness (the initial phase of excitement). A roll of print film may take several days to finish before it can be processed. Upon its return from the photo lab, the prints are sorted. The dentist writes a short explanatory note and mails the prints to the patient. Even with a wonderfully efficient system, the prints are not likely to

be in the patient's hands until at least three weeks after the final appointment, well after the excitement phase has subsided. This delay precludes any marketing benefit.

Instant prints, however, can be provided to the patient immediately on the completion of treatment. Since the prints are self-developed within moments of being taken, the dentist or auxiliary simply hands them to the patient with a provider identification sticker. The effect is immediate, visual, and personal. In most cases, before-and-after pictures demonstrate a dramatic alteration of the patient's smile, providing an excellent conversation piece that can be harnessed during the initial phase of excitement.

Instant prints are also successfully used in dentist-dentist referral situations to highlight visually a particular problem or condition. Dentist-laboratory technician communications are greatly enhanced with the addition of a visual component to the lab prescription.¹¹

The Macro 5 SLR

A number of instant print cameras have been available over the years, including the venerable CU-5 and the more recent AcmeL. The newest entry is the Polaroid Macro 5 SLR. Technological advances in the Macro 5 provide ease of use and consistent results at a lower price than previous instant cameras. It offers a 9.0 cm x 7.5 cm self-developing full-color image, which reproduces faces, smiles, and close-ups with excellent detail.



Fig. 5: Polaroid 990 color instant film.

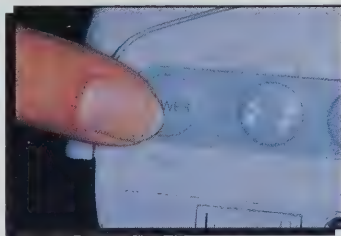


Fig. 6: Powering the Macro 5 camera.

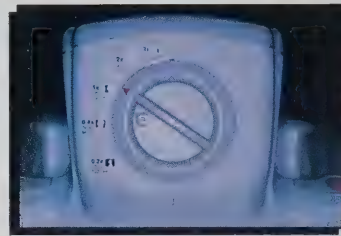


Fig. 7: Selecting the magnification on the lens dial.



Fig. 8: Positioning a "smile" instant photograph.



Fig. 9: Positioning a "full-face" instant photograph.



Fig. 10: Identify provider dentist with a sticker.

The Macro 5 has a built-in multi-magnification feature ranging from 0.2X (full-face or 20 per cent magnification) to 3X (very close-up or 300 per cent magnification). The most common feature for dentists will include the 20 per cent full face, the 100 per cent life size (Fig. 3), and the 200 per cent close-up (Fig. 4). There is no need to buy extra lens kits as all the lenses are self-contained. Altering the magnification involves a simple rotation of a dial. The framing icons on the dial indicate the approximate field size for each selection.

The SLR feature indicates that the dentist can preview the subject through the viewfinder. As a result of this feature, the finished print will incorporate exactly the image that is observed on the built-in grid screen. This eliminates the guesswork of framing a subject, which was a requirement with previous instant cameras.

Focusing is easily accomplished. In addition to the distance guide for each magnification, two small focusing lights will project onto the subject when the shutter button is slightly depressed. The dentist moves in and out from the patient until these white dots inter-

sect. Once they have merged into a single point, the picture is perfectly focused.

The relative illumination of each magnification may be adjusted through the lighten/darken controls to maximize the color balance of the resulting print.¹² The on-board camera chips then memorize the optimal setting at each magnification and return to it when that image size is selected.

There are two flash units, one located on either side of the lens. One or the other flash (or both) may be turned off to create shadows that enhance the artistic or the dramatic qualities of the print.

The Macro 5 is smaller and lighter than its predecessors. It uses four AA batteries (compared to the four C cells of the Acmel) and Type 990 film (Fig. 5), a high-speed (ISO 640), high-definition film well-suited to dental needs. Each film packet contains 10 sheets and a battery unit to power its operations. The Macro 5 automatically turns itself off after 30 seconds of non-use, preventing the inadvertent loss of battery power.

Integrated date and time controls permit the practitioner to print this information directly onto the print for documentation purposes.

Using The Macro 5 SLR

1. Press the power button to turn on the camera (Fig. 6). The red indicators will flash while the batteries are charging. Once the green indicators have appeared (several seconds), the camera is ready to take pictures.
2. Set the magnification dial to the selected field size (Fig. 7). The lighten/darken controls will automatically return to the custom settings for that magnification.
3. View the subject through the viewfinder to compose the picture. Press the shutter button *slightly* to activate focusing lights.
4. Align the focusing lights on the subject through the viewfinder (Figs. 8 and 9).
5. Press the shutter button completely to take the picture. Aperture, flash, and exposure are determined automatically by the camera.
6. The instant print is automatically ejected from the camera. Put it aside for several minutes while the picture develops.

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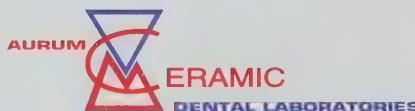
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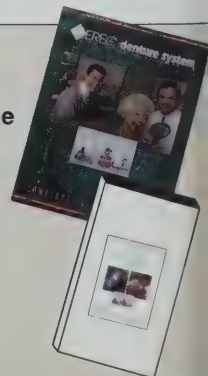
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7. Identify the providing dentist with a sticker at the bottom of the print (Fig. 10).

The learning curve that is involved with the Macro 5 is minimal — five to 10 pictures will make the user comfortable. This procedure can be readily delegated, and the dental auxiliary is most often responsible for taking the instant prints.

The instant print photographic process is simple, predictable, accurate, and effective. It allows the dentist to readily harness the initial phase of excitement through instant print documentation of a successful esthetic procedure. Tapping into this potential source of referrals will increase the dentist's indirect marketing reach and educate potential patients about the benefits of cosmetic dentistry. ■

Dr. George Freedman is director of post-graduate programs in esthetic dentistry at Baylor, the University of Buffalo Dental School, the University of Minnesota and the University of Missouri and maintains a private practice in Markham, Ontario.

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CLINICAL



Posterior Acid-Etch Bridge — A Modified Retentive Design

Omar M. El-Mowafy, BDS, PhD

ABSTRACT

This article reviews the recent literature on clinical trial studies of acid-etch bridges. Due to long-term retention problems, acid-etch bridges are not as yet considered among the permanent types of bridge prosthesis. When failure of acid-etch bridges occurs, the weak link seems to be the enamel-resin junction rather than the metal-resin junction.

A modified posterior acid-etch bridge design is described in detail. This design, which incorporates a major retention-promoting component, is meant to improve long-term retention of posterior acid-etch bridges. Cast projections are added to the bridge design. These fit loosely into slot cavities made in the abutment teeth. Following bridge cementation, the slot cavities are restored with posterior composite. As a result, the cast metal projections are locked into the abutment teeth. This added retention device will maximize the long-term retention of posterior acid-etch bridges.

SOMMAIRE

Dans cet article, on révisé la littérature récente portant sur les essais cliniques des ponts mordancés par acide. À cause des problèmes de rétention à long terme, on ne range pas encore ces ponts parmi les prothèses pontiques permanentes. Lorsque ces ponts brisent, le point faible semble en être la jonction émail-résine plutôt que la jonction émail-métal.

On présente et décrit donc en détail la conception modifiée d'un

pont postérieur mordancé par acide dans le but d'en améliorer la rétention à long terme en y incorporant une pièce importante pour la favoriser. Ainsi, dans la conception du pont, on y ajoute des saillies qui entrent aisément dans des rainures creusées dans les dents d'ancrage. Après la cimentation du pont, on restaure les rainures avec du composite postérieur, bloquant ainsi dans les dents d'ancrage les saillies coulées en métal. Ce dispositif de rétention additionnel maximise la rétention à long terme des ponts postérieurs mordancés par acide.

Introduction

Bridges retained by bonding to etched enamel using resin composite cements were introduced by Rochette¹ in 1973. These earliest cast-bonded bridges featured thin perforated veneers of metal cemented to the acid-etched enamel of the supporting (abutment) teeth. Since retention was limited, bridges of this early design were used primarily in the anterior region of the mouth. Performance was generally unreliable.

This particular cast-bonded bridge design was modified by Livaditis and Thompson,^{2,3} who used electro-chemical etching of the fitting surface of the metal veneers (wings) to provide microroughness instead of perforations. This type of acid-etch bridge is also known as the Maryland bridge after the place where Livaditis and Thompson did their work. Further research showed that grit blasting using a microetcher of base metal produced

retention comparable to electro-chemical etching. Silicoating can also be effectively used with some metal alloys.⁴ Because of efficiency, effectiveness, and convenience, grit blasting is widely used for conditioning the bonding surfaces of the so-called etched-bonded bridges. Other modifications that have been made to improve retention include the incorporation of rest seats and grooves in the preparation design. However, these bonded bridges still fail to provide excellent long-term success. A selected group of the most recent studies evaluating etched-bonded bridges is presented below.

Dunne and Millar,⁵ who studied the survival of 382 resin bonded bridges and splints using the Rochette, electro-etching, and grit blasting methods, concluded that to maximize the potential for survival, the electro-etched or grit-blasted bridge must be limited to single tooth replacement. The use of the Rochette design was not recommended. In this study, of the 553 bridges that were initially placed, only 382 were available for follow-up for periods ranging from five months to eight years. The 50 per cent survival time for all types of bridges together (including splints) was about 4.5 years.

In a retrospective study by Berkally and Smales,⁶ which looked at the survival time of 34 Rochette and 228 Maryland bridges, a number of interesting conclusions were made. Maryland bridges had a significantly better survival rate than the Rochette bridges (20 per cent failure rate for Maryland bridges compared to 71

per cent failure rate for Rochette bridges over a period of six years). Better retention rates were found with more retentive abutment tooth preparations, lower occlusal stresses, and in older patients. Interestingly, debonded bridges had a predominance of enamel-to-resin bond failures rather than metal-to-resin bond failures.

Simon et al⁷ reported findings of a clinical trial study which tested a modified design to improve the retention of acid-etch bridges. The major modification was the addition of grooves and rest seats to the original design. They found that this modification resulted in an improvement in the four-year retention rate of posterior acid-etch bridges from 60 per cent to 95 per cent, compared to the original design. However, for the anterior region, the addition of such extra retention features did not add significantly to the four-year retention rate. The four-year debond rate for anterior acid-etch bridges ranged from 20 per cent to 25 per cent. Simon et al⁷ concluded that the acid-etch bridge technique provides the dentist with a viable, conservative — but less than permanent — alternative to restoration of edentulous spaces. They also concluded that the placement procedure of acid-etch bridges was a key factor in retention longevity, as it is highly technique-sensitive.

In contrast to these findings, Verzijden et al,⁸ who analyzed the results of two different clinical trial studies on posterior acid-etch bridges, found that the addition of proximal grooves to the bridge design resulted in only a marginal improvement in the survival rates (from 61 per cent to 68 per cent in one study, and from 64 per cent to 75 per cent in the other study, both conducted over a two-and-one-half-year period). Bridge location was found to be a much more significant factor in survival, with mandibular bridges having a failure rate almost three times that of maxillary bridges.

In a recent short-term clinical trial study (mean of one year and nine months), Besimo⁹ reported a debond rate of only one case out of 82 inserted bridges. The low failure rate was attributed to the use of non-precious metal alloys rather than gold-based alloys. Gold-based alloys may result in local regions of high stress concentration due to their lower modulus of elasticity. This is an interesting finding, even though a clinical trial

time of only one year and nine months is considered too short for making valid conclusions.

In a preliminary report of a long-term clinical trial study (10 years) examining anterior and posterior acid-etch bridges, Crispin¹⁰ stated that acid-etch bridges are technique-sensitive, and that meticulous attention to procedural detail is required for optimal success.

In another study by Isidor and Stokholm,¹¹ in which 23 posterior acid-etch bridges were monitored for a period of four years, debonding did not occur in any of the 23 bridges. Instead of using wings on the abutment teeth, the authors used two- and three-surface inlay retainers that were dentin-bonded. Although this design might be appropriate in those situations where the abutment teeth are already restored, it is a little too invasive when the abutment teeth are caries-free. No attempt was made in this study to investigate the suitability of this design for anterior teeth.

In a meta-analysis study by Creugers and Van't Hof,¹² which combined data from 16 different clinical trial studies on the survival of resin-bonded bridges (total $n = 1,598$), the overall survival rates were: one year, 89 per cent; two years, 84 per cent; three years, 80 per cent; and four years, 74 per cent.

When acid-etch bridges fail due to debonding, they can be rebonded following a specific procedure. However, according to Creugers and Kayser,¹³ rebonded acid-etch bridges are more susceptible to dislodgement than originally placed ones. This conclusion was based on a study that involved 203 acid-etch bridges.

Wood and Thompson¹⁴ stated that the weak link in the bonded acid-etch bridges is still the resin-to-enamel bond. Methods that will increase the bond surface area are required if overall retention is to be improved.

Comspan resin cement seems to have been the most commonly used cement in previous clinical trial studies. Today, a number of new and improved resin cement systems have been developed. Many of these systems are capable of bonding to dentin as well as to enamel. Although the bond strength of these cements to enamel is similar to the older ones, their capability of bonding to

dentin offers a new opportunity for modifying the preparation design.

Modified Posterior Acid-Etch Bridge Design

Tooth Preparation

This kind of prosthesis is indicated for the replacement of missing single posterior teeth with intact or minimally-restored abutment teeth. Using a No. 245 tugsten carbide bur at high speed, two slot preparations, as described by El-Mowafy,¹⁵ are made: one in the distal aspect of the abutment tooth anterior to the edentulous space, and the other in the mesial aspect of the abutment tooth posterior to the edentulous space (**Fig. 1**). These must have buccal and lingual walls that are slightly converging toward the occlusal surface to provide mechanical interlocking (**Fig. 2**). The lingual surfaces of the abutment teeth are prepared to receive the bridge wings. A chamfer diamond bur is used at high speed for this purpose, and as large as possible an area on the lingual surface is involved. The cavo-surface margins (buccal, lingual, and gingival) of the two slot preparations are bevelled in a manner similar to the slice of approximal surface used

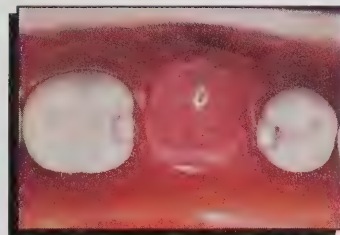


Fig. 1: Top view showing the two slot cavity preparations on the lower second premolar and second molar teeth.



Fig. 2: Close-up of the slot cavity preparation on the lower second premolar. A cavo-surface bevel continuous with the lingual wing preparation can be seen. Note the convergence of the facial and lingual walls of the slot cavity. This will provide mechanical interlocking of the resin composite restoration following bridge placement.

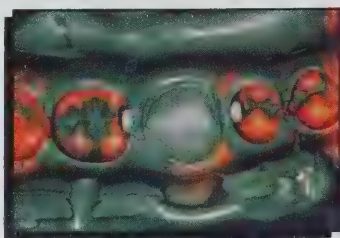


Fig. 3: Impression of the bridge preparation. Recording of the internal fine details of the two slot cavities is not necessary as the casting will not totally fill these spaces.

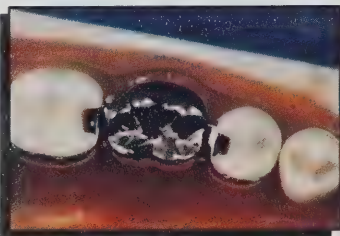


Fig. 4: Top view of the prepared teeth with the fabricated casting in place for try-in. Note the two cast projections, which extend into the two slot cavities. These will be locked in once the two cavities are restored with posterior composite. This earlier design was made without occlusal rests on the abutment teeth. Ideally, occlusal rests should be incorporated into the bridge design to maximize stability.

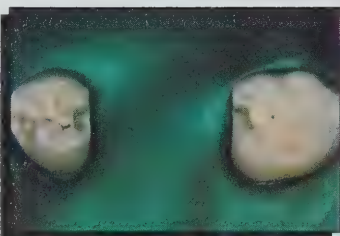


Fig. 5: In this bridge design, two lingual rests were included in the design: one on the molar tooth at the lingual groove area; and the other on the pre-molar in the mesial triangular fossa area.

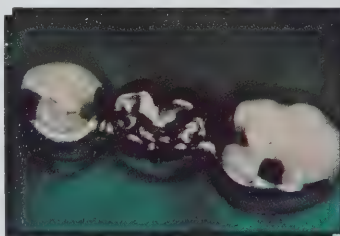


Fig. 6: Top view showing prepared teeth with the fabricated casting in place for try-in. The occlusal rests can be clearly seen, as well as the cast projections into the two slot cavities.

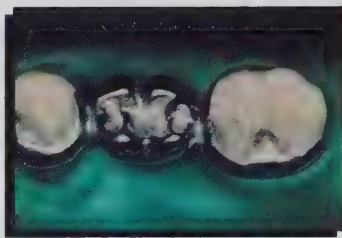


Fig. 7: Top view showing the two teeth following bridge cementation and restoration of the two slot cavities with posterior composite.

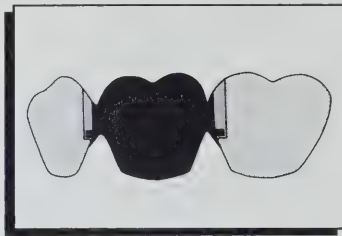


Fig. 8: This diagram shows the slot cavities in cross-section with the metal projections of the bridge restoration extending into the cavities.

with the gold inlay preparation. This bevel is made continuous with the lingual surface reduction on each abutment (Fig. 2). The reason for the approximal bevel or slice is to provide room for a built-in permanent matrix, which is incorporated in the cast restoration design. This will allow direct restoration of the slot preparations with posterior resin composite immediately following cementation of the bridge wings, and will remain an integral part of the bridge. Finally, lingual rest seats are made on both abutment teeth. As an option, the preparations may include grooves at the lingual peripheries of the two wing preparations.

Cast Restoration

Following impression-taking, as with routine prosthodontic work (Fig. 3), a cast restoration is made in the same manner as for conventional acid-etch bridges, except for the fact that two small projections designed to fit in the centres of the slot preparations are incorporated in the wax-up (Fig. 4). These projections can take several geometrical forms. Care should be taken, however, to avoid making them too bulky and thus interfering with the access needed for the subsequent restoration of the slot preparations with posterior composite. Ideally, they should be

made to rest on the gingival seats. Occlusal rests on both abutment teeth aid in seating and prevent possible tissue-ward displacement of the casting (Figs. 5 and 6). Following casting and porcelain application, the fitting surfaces of the restorations are etched with a micro-etcher using 50 µm aluminum oxide powder. Following rinsing in an ultrasonic water bath for two minutes, the casting is ready for cementation.

Cementation

Cementation consists mainly of two major steps: First, the wings of the bridge are cemented to the abutment teeth; and second, the two slot cavities are restored with posterior composite. The use of rubber dam is important to ensure optimal bonding and maximize the longevity of the prosthesis. Following a successful try-in procedure, the bridge is ready for cementation. By employing the all-etch technique using a reliable dentin bonding system (All-Bond 2, for example), the enamel of the lingual surfaces of the preparations, as well as the enamel and dentin of the slot preparations, are etched with 10 per cent phosphoric acid for 15 to 20 seconds. Several coats of primer (A+B) are then applied to the etched dentinal surfaces and light-cured for 15 seconds. A thin layer of pre-bond resin is then applied to the primed dentin surfaces and the enamel. The fitting surface of the etched prosthesis is primed according to the cement manufacturer's instructions. A small amount of a reliable posterior composite material (Z-100, for example) is placed in the depth of each slot preparation without light-curing. The selected cement (All-Bond Crown and Bridge Cement, for example) is mixed and applied to the fitting surfaces of the bridge's wings and to the peripheries of the slot preparations' areas. The bridge is seated and held in place until complete setting of the cement occurs. Light-curing of the composite in the depth of the two slots follows. The slot cavities are then completely restored with the posterior composite (Fig. 7).

Alternatively, a chemical-cure (two-paste) type of posterior composite may be used, followed by finishing and polishing of the composite restorations. Fig. 8 shows a

cross-section of a casting with the metal projections embedded into the resin composite slot restorations. Care should be taken to remove the excess from the interproximal areas. The rubber dam is then carefully removed and occlusion is checked and adjusted if necessary.

The advantages of this modified bridge design over conventional acid-etch bridges are that it provides micro-mechanical retention through acid-etching of enamel and dentin, as well as macro-retention through mechanical interlocking of the cast projections with the composite-restored slot cavities. Its superior long-term retention will contribute to clinical longevity and success.

Compared with the conventional acid-etch bridge, the disadvantage of this bridge design is that a little more aggressive preparation is required if the abutment teeth are intact, since two slot cavities must be prepared. Nevertheless, it remains considerably more conservative than a conventional full-coverage bridge preparation. While only a limited number of cases have been treated

with this modified bridge design, a prospective long-term clinical trial study will help to objectively determine the survival rate of this modified acid-etch bridge. ■

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INFECTION CONTROL



Progress In HIV and AIDS Care

Joel B. Epstein, DMD, MSD

Gillian M. McCarthy, BDS, M.Sc.

The world-wide AIDS epidemic is reflected in the statistics: 1.3 million AIDS cases have been reported; due to under-reporting six million cases have been estimated; and approximately 20 million individuals are estimated to be infected with HIV. Heterosexual transmission is responsible for 71 per cent of the cases around the world; homosexual transmission 15 per cent, and injection drug use seven per cent.

International Conference on AIDS — 1996

Considerable progress has been made in understanding HIV and AIDS, and in managing infected individuals. This progress was highlighted at the 11th International Conference on AIDS, held in Vancouver July 7-12, 1996.

The meeting, which combined scientific, psychosocial, and advocacy issues, attracted approximately 15,000 participants, making it the largest conference ever held in Vancouver. During the event, various interest groups demonstrated and made demands for a renewal of the Canadian AIDS Strategy, as well as for adequate funding of research and care. Similar concerns were voiced by the United Nations's (UN) AIDS Executive Director, Peter Piot, who said that the benefit from the advances currently taking place in treatment and testing, all of which were presented at the conference, would be limited to a minority of HIV-infected persons living in developed countries.

During the conference, the biology of HIV over the past several years was further elucidated. Also discussed was the dramatic and frequent mutation of the virus. The number of HIV strains has expanded. In fact, the shift in the virus has been related to point mutations during viral replication, and to a recombination of various viral RNA strands during replication.

One of the factors leading to the dramatic progress that has occurred in AIDS treatment is the ability to assess viral load within an individual patient. Previous measures of immunity and outcomes of therapy had focused on helper T-cells (CD4 cells). Now, measurement of plasma viral load can be used to assess response to treatment and disease progression.

These results must be interpreted with caution, however, as this measure ignores the number of viral particles in cells — 10 billion in plasma and 200 billion in cells. To understand antiretroviral efficacy fully, it is necessary to know what is happening in the lymph nodes. New assays that can sample virus in lymph nodes and tonsils have been developed for this purpose.

Major advances in therapy have been possible by understanding the molecular biology of the virus. Previous therapies have relied on a similar class of drugs (nucleoside analogues) such as Zidovudine (AZT) and others (DDC, DDI, 3TC, etc.). A new class of drugs, known as protease inhibitors, has recently been introduced into clinical tri-

als. In the past, combinations of nucleoside analogues appeared to offer the best hope for management. Now, however, nucleoside analogues in combination with protease inhibitors have become the current state-of-the-art. As these drugs act at different sites, the effect of various combinations has been shown in studies to result in a marked reduction in viral load, which suggests that elimination of HIV within an infected host may be a possibility. Several protease inhibitors are being studied in clinical trials, and an additional class of antiviral agents that affects the viral integrase may become available for clinical study in the near future.

These combination therapies offer hope for HIV-infected individuals and those with AIDS. This has led many researchers to conclude that HIV may ultimately become a chronic condition, and that there is a very real and tantalizing possibility that HIV can be eradicated from an infected host.

Despite the progress in the use of antiretroviral drug combinations, there are concerns related to the ability of HIV to produce transmittable resistant strains. Tests are being developed to detect resistant mutations in new candidates for antiretroviral therapy. One such test — the line probe assay — shows promising results for clinical use.

Many investigators stressed the importance of increasing our understanding of the immune system's ability to block infection and



delay disease progression. Interest has centred on immune modulation, specifically CD8+ cell suppressor factors and various cytokines that can potentially impede viral replication. Researchers in San Francisco have been investigating the CD8 Antiviral Factor (CAF), which they believe is produced by CD8+ cells from long-term non-progressors, but have been unable to confirm this process. In addition to identifying more effective antiretroviral agents, the ability to boost the immune response will increase the possibility of a cure for HIV infection.

For much of the developing world, however, HIV prevention is the only means of containing the epidemic. Preventive approaches include education, change in behaviors (sexual and drug use), and the use of barrier techniques. Much debate was given to the possible development of a vaccine that would prevent infection. Several vaccine trials are under way, and a large vaccine trial in Thailand was discussed. Although some studies have shown our ability to stimulate the development of various antibodies, their effectiveness in preventing a primarily intracellular virus has not been shown. A number of scientists argued against the initiation of large-scale vaccine trials until their effectiveness has been demonstrated.

Diagnosis of HIV is difficult in the developing world, where there is little access to laboratory techniques, and the costs of such assessments render this approach impossible. In such a setting, the evaluation of patients, including oral findings and oral examination, become useful markers for HIV/AIDS recognition and diagnosis.

Some progress has been made in understanding the malignancies associated with HIV disease. For example, Kaposi's sarcoma has been associated with immune suppression and the presence of a recently-diagnosed human herpes virus (HHV type 8). Understanding the mechanisms of development for the various malignancies may lead to additional and novel therapies in AIDS treatment. It is also possible that, with the improved survival of individuals with HIV and AIDS, the development of other ma-

lignant diseases requiring extensive management will increase.

Survey of Canadian Dentists

The results of a national survey of dentists in Canada, carried out at the University of Western Ontario, were presented. This confidential, mailed survey included items on sociodemographics, in addition to the practitioners' knowledge and attitudes toward HIV and infection control.

Questionnaires were distributed to a random sample of all licensed dentists in Canada, stratified and weighted by province. The response rate was 66 per cent. Approximately 15 per cent of dentists reported that they would refuse to treat patients with HIV. Multivariate analysis showed that respondents who reported having no ethical responsibility to treat patients with HIV were the best predictor of a refusal to treat. Other predictors include fears related to cross-infection and loss of other patients if a dentist provides treatment for persons with HIV/AIDS, as well as a lack of knowledge related to infectivity. The comprehensive results of this study will be submitted for publication shortly.

Oral Manifestation of HIV — 1996

Prior to the Vancouver meeting, the 3rd International Workshop on the Oral Manifestations of HIV Infection was held in London, England. Sessions focusing on oral care were held as satellite symposia to the 11th International Meeting in Vancouver.

Discussions on etiology as well as the management of oral conditions associated with HIV and AIDS were presented at the three-day meeting in London, followed by a one-day continuing education course. These sessions discussed advances in oral care and the underlying mechanisms of the disease processes. Papers presented at this conference will be published in a fall issue of the journal *Oral Diseases*.

Satellite sessions were held, co-sponsored by the Dental Alliance for AIDS/HIV Care and Vancouver Hospital, Department of Dentistry, and supported in part by Colgate

Oral Pharmaceuticals. Three sessions were held: 1) Presenting head and neck and oral examination for health care providers; 2) Recognizing oral manifestations of HIV/AIDS and oral and dental care for individuals with HIV and AIDS; and 3) The role of the dentist in pain management, infection, recognition, and diagnosis of oral conditions. The role of dentistry in the prevention and management of oral complications was also discussed.

Emphasis was placed on the need to educate health care workers about infection, recognition, and diagnosis. The last session focused on the interesting or difficult cases presented at clinical pathologic conferences. All the sessions were designed to promote interaction between the presenters and the audience.

Summary

These recent meetings emphasized the considerable progress that has been made in HIV/AIDS. The prospect for non-progression of the disease, improved management of complications arising from the condition, and the potential for additional progress were the hallmarks of these meetings. The considerable developments that have occurred make it necessary for the dental profession to continue to play a role in the recognition, diagnosis, and management of oral conditions, and to keep abreast of the considerable developments in this field — and the implications that these developments have for patients presenting with complications related to other conditions, which may include bacterial, fungal or viral infections and malignant disease. ■

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Dr. Gillian McCarthy is an associate professor in the University of Western Ontario's dental faculty, and a career scientist with the Ontario Ministry of Health.

CLINICAL



Repair of Washout Defects

Izchak Barzilay, DDS, MS

ABSTRACT

Endodontic therapy may be needed after extensive fixed partial denture treatment. When endodontic access preparation is performed through a cast restoration, retention of the restoration is reduced and the underlying abutment structure may be weakened. Eventually, it may give way to cement breakdown and caries, resulting in a washout defect, which can jeopardize the restoration's longevity. This paper describes the clinical management of such a situation using stainless steel prefabricated posts and a bonding cement.

SOMMAIRE

Une thérapie endodontique peut s'imposer après un important traitement comprenant une prothèse partielle fixe. Lorsque l'accès endodontique est préparé à l'aide d'une restauration coulée, la rétention de celle-ci est réduite, la structure sous-jacente du pilier peut être affaiblie et peut finir par entraîner une dégradation du ciment et causer des caries. Il s'ensuit ainsi une récurrence de carie. Dans cet article, on décrit la gestion clinique d'une situation pareille où l'on a utilisé des tenons en acier inoxydable préfabriqués et un ciment liant.

Introduction

The preparation of abutment teeth involves tooth reduction to

accommodate the restorative materials that make up a fixed partial denture. After prosthesis cementation, discomfort may be felt in the abutment teeth due to the cementation procedure, hyperocclusion, cement breakdown (decementation), or the effects of tooth reduction on the dental nerve. Endodontic treatment is often prescribed to alleviate this pain.¹⁻³ If the prosthesis cannot be easily removed, access to the root canal space may be achieved directly through the occlusal surface of the restoration. Such access preparations may be obtured with either amalgam or composite resin restorations to maintain occlusion, seal the access chamber, and improve prosthesis retention.^{4,5}

Washout defects may be detected at the recall examination, and may have the radiographic appearance of a zone of reduced density between the root structure and the restoration. Clinically, the area is a band of carious tooth structure, and represents a discontinuity defect between the root and the crown. It is a cause of reduced support for the overlying prosthesis.

This paper is a clinical report describing a case where abutment washout was encountered and treated.

Case Report

A 50-year-old female patient presented complaining of an unpleasant taste originating from her maxillary posterior teeth. The pa-

tient had been under constant care by a periodontist, who noted "overhanging" margins of the restored abutment teeth. Clinical examination showed that the maxillary right second premolar (15) was the most distal abutment, with a functioning distal cantilevered pontic. The maxillary left first premolar (24) was the second to last abutment on the left side, and had been designed with a distal cantilevered pontic. Both these teeth had endodontic therapy performed after bridge cementation, as evidenced by the endodontic access preparations present in the occlusal surfaces. Both teeth had amalgam occlusal restorations present, obturating the access preparations.

Occlusal analysis showed contact in centric occlusion and in lateral excursions on both cantilevered pontics, as well as on the remaining abutment teeth. Radiographic examination showed a discontinuity defect between the overlying fixed partial denture and the root structure. Treatment involved reconnecting and filling the gap between the remaining root structure and the existing restoration.

The amalgam obturation material and all substances inside the abutment crowns (15 and 24) were removed and the inside of the abutments were debrided by light grinding and flushing with air/water spray. A gingivectomy procedure was performed to remove the marginal gingiva, using



Fig. 1: Tooth 24 has been debried and the tissue cleared in preparation for bonding.



Fig. 2: Two stainless steel prefabricated posts have been fitted and are ready for cementation.



Fig. 3: Metabond C&B resin cement is delivered with a syringe to the prepared root canals.

electrosurgical techniques to expose a viable dentinal margin of the remaining root structure (**Fig. 1**). The remaining root structure was prepared to receive prefabricated stainless steel posts (.040 Parapost Plus, Whaledent Int., New York, N.Y.) through the endodontic access (**Fig. 2**). A verification radiograph was made to ensure full seating. These posts were then air abraded with 25 micron grit aluminum oxide in preparation for cementation. The prepared canal spaces were conditioned with the dentin conditioner (10 per cent ferric chloride and three per cent citric acid; Metabond C&B, Parkell Inc., Farmingdale, N.Y.), rinsed with water and dried with air and paper

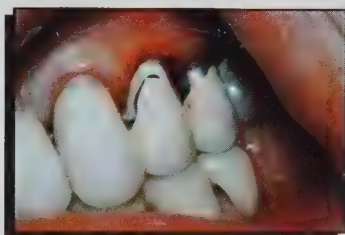


Fig. 4: The proper buccal contours have been re-established using composite resin.

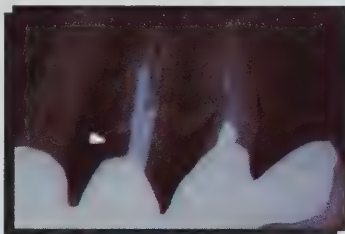


Fig. 5: Periapical radiograph made of the repaired washout defect on tooth 24 after six years in function. The area still has the characteristic washed-out look (arrow) due to the removal of carious tooth structure, but no further breakdown was noted clinically.

points. Metabond C&B resin cement was mixed according to the manufacturer's recommendations, loaded into a needle tube syringe (Centrix Inc., Milford, Conn.) and delivered into the canal spaces (**Fig. 3**). With the cement in position, the posts were seated into the canals through the endodontic access preparations. Resin cement was then injected laterally through the gingival openings into the bridge retainers and allowed to set for 10 minutes. The portions of the posts that protruded through the access preparations were severed and shortened to a level 1.5 mm below the occlusal surface of the restorations. The occlusal and gingival access preparations were sealed with composite resin (Herculite XR, Kerr Manufacturing Co., Romulus, Minn.) and finished to the appropriate tooth contour (**Fig. 4**). The restored areas were polished and the occlusion adjusted to ensure minimal contact in the centric occlusal position, with no contact in any lateral or protrusive excursions. The patient was then placed on recall, with the restorations being evaluated periodically.

The patient has been seen on recall examination for the past six



Fig. 6: Periapical radiograph of the repaired washout defect on tooth 15 after six years in function. The washout area is visible (arrow) and is now filled with composite resin. Occlusion may have played a greater role in the demise of this abutment because it is the terminal abutment.

years. No further breakdown of the repaired restorations or recurrence of the foul taste have been noted (**Fig. 5**).

Discussion

This clinical report illustrates that it is possible to reattach a "disconnected" abutment to an existing fixed partial denture using a bonding resin cement that bonds to both tooth structure and metal. In doing this, support is once again provided for the prosthesis, albeit somewhat reduced, and adjustments in the occlusal scheme may be needed to avoid overloading the prosthesis. In this report, occlusion was adjusted to remove lateral occlusal contacts on the cantilevered pontics.

Discomfort immediately after cementation of a prosthesis may be a result of dental nerve trauma during tooth preparation or dental nerve sensitivity due to the cementation procedure. Under these conditions, the fixed partial denture should be removed, if possible, using a "bridge remover" type of device without damaging the underlying abutment. Endodontics can then be performed and the prosthesis recemented. If prosthesis removal is not possible, endodontic surgery may be a viable treatment option in certain situations. If either prosthesis removal or endodontic surgery is not possible, the next course of action would be to perform endodontics with access through the occlusal surface of the fixed partial denture. Access preparation not only reduces retention of the overlying prosthesis^{4,5} but also removes coronal tooth structure, which significantly reduces support for the

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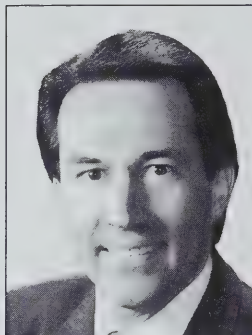
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prosthesis. If the weakened abutment is not reinforced after endodontic therapy, the abutment remnants may physically break down, causing the cement to deteriorate, wash out, and the tooth structure to decay — creating a similar situation to the case study presented here, especially on the left side (maxillary left first premolar).

The maxillary right second premolar could have also undergone the same process (Fig. 6). However, the occlusal pressures may have been greater on this side since this tooth is the posterior abutment supporting the distal cantilever, originally in occlusion. In this situation, it is reasonable to assume that occlusal forces may have hastened the deterioration of the abutment tooth structure.

One may consider a different series of clinical events where occlusal pressures placed on the cantilevered restoration may have broken down the luting cement, resulting in discomfort due to microleakage. Once the patient felt this discomfort, endodontics may have been performed to alleviate the pain. With the discomfort alleviated, only the access preparation may have been filled, and consequently the operator may not have realized that the cement had washed out. The interface between the prosthesis and the prepared tooth structure would then be free to decay further and create a washout defect. In this situation, a connection would have to be made between the tooth structure and the prosthesis framework. Since the cement space is no longer filled with luting agent, the remaining tooth structure in the abutment would have to be removed down to the area of the margin, and the root reconnected to the prosthesis framework using a post cemented with a bonding cement. This cement would not only connect the post to the root structure, but would also replace the missing abutment structure. The new abutment structure would now be bonded to the inner aspect of the prosthesis framework.

Due to the design of cantilevered restorations, movement in the restorations because of cement washout may not be easily noticed since the anterior abutment(s) may

still be connected, hiding the fact that one of the other abutments may be loose. If the non-cemented retainer is allowed to cause abutment decay, forces — now greater because of the increased length of the cantilever — could affect other teeth and cause deterioration.

Treatment must aim to avoid the "washout defect." This can be accomplished by: 1) Proper cementation of the prosthesis; 2) Properly designed prostheses; 3) The use of bonding cements when retention on abutments may be questionable; and 4) Immediate obturation of endodontic access cavities with bonded restorations (either core or post and core).

Controlled studies are required to evaluate the best method of restoring crowned teeth that have had endodontic access prepared through their occlusal surfaces. This is especially important when these teeth support fixed partial dentures.

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CLINIQUE



La fibromyalgie en médecine dentaire

Sylvie Louise Avon, DMD

ABSTRACT

Fibromyalgia represents one of the most frequent musculoskeletal problems. This condition, associated with widespread pain, is characterized by a number of specific tender points, as well as symptoms such as tiredness, limb stiffness, depression and a lack of refreshing sleep. Patients suffering from fibromyalgia can also demonstrate the same clinical features as temporomandibular disorders or myofascial pain. Dentists should be aware that certain dental treatments will not be effective in patients suffering from temporal and masseter pain if fibromyalgia has been diagnosed.

SOMMAIRE

La fibromyalgie représente l'un des plus fréquents problèmes musculo-squelettiques. Cette affection associée à une douleur chronique diffuse est caractérisée par plusieurs points douloureux spécifiques accompagnés de symptômes comme la fatigue, les raideurs, la dépression et un sommeil non réparateur pour n'en nommer que quelques uns. Des patients souffrant de fibromyalgie peuvent aussi manifester un tableau clinique semblable à celui des troubles temporo-mandibulaires ou des douleurs myofasciales. Le dentiste devra être de plus en plus sensibilisé à la possibilité d'un diagnostic de fibromyalgie chez des patients ayant des douleurs temporales et massétériennes, car la planification de certains traitements bucco-

dentaires chez ces patients pourrait s'avérer inutile.

Introduction

La fibromyalgie est une forme de rhumatisme non articulaire caractérisée par des douleurs musculo-squelettiques diffuses.

Les patients qui consultent ont souvent de la difficulté à décrire leurs douleurs. Ils la décrivent comme une sensation de brûlure accompagnée de raideurs, de gonflements articulaires et d'engourdissements. Certains disent avoir mal aux os, aux muscles et ce, depuis plusieurs mois, voire plusieurs années. En général, ce sont des douleurs qui apparaissent de façon insidieuse, souvent à un site anatomique spécifique pour se propager à d'autres régions.

Un nombre substantiel de patients souffrant de fibromyalgie présentent des douleurs temporales et massétériennes que le dentiste confond parfois avec une dysfonction temporo-mandibulaire, ce qui engendre souvent des traitements inutiles comme le port de la plaque occlusale, l'ajustement de l'occlusion, la chirurgie ou l'orthodontie, pour ne nommer que les plus importants.

Histoire de cas

En octobre 1988, une patiente âgée de 24 ans consulte un prosthodontiste pour des douleurs à la mâchoire.

L'examen clinique révèle une occlusion de Classe II avec bécane antéro latérale droite et postérieure gauche, une ouverture maximale à 39 mm, une déviation vers la droite

à l'ouverture, des bruits articulaires bilatéraux lors des mouvements excentriques, de la douleur à la palpation des articulations temporo-mandibulaires, de la douleur à la palpation des muscles masséter gauche, ptérygoidien interne droit, ptérygoidien externe gauche et sternocléidomastoïdien gauche et droit.

La patiente confirme avoir des habitudes parafunctionnelles tels le bruxisme et le serrement des dents.

Le diagnostic établi alors est celui d'un déplacement méniscal bilatéral avec douleurs myofasciales, le traitement recommandé, une plaque occlusale.

Deux semaines après la mise en bouche de la plaque occlusale, les douleurs musculaires sont disparues, l'ouverture maximale est à 43 mm et un meulage sélectif est effectué sur deux dents. On suggère à la patiente une consultation en orthodontie pour sa bécane occlusale. N'en ayant pas les moyens, elle est dirigée en chirurgie buccale et maxillo-faciale.

En 1989, elle rencontre un chirurgien buccal et maxillo-facial qui, émet un diagnostic d'excès vertical avec latéro-déviation du maxillaire supérieur vers la droite, rétrusion de la symphyse mentonnière avec incompétence labiale et rétrusion mandibulaire avec latéro-déviation vers la droite. En février 1990, la patiente est opérée pour une ostéotomie des deux maxillaires et de la symphyse. Les douleurs demeurent par la suite inchangées, même pires occasionnellement.

En octobre 1990, elle consulte le même prosthodontiste rencontré deux ans plus tôt pour ses douleurs musculaires et désire une autre plaque occlusale. Une plaque est mise en bouche et une consultation en orthodontie est suggérée à nouveau avant d'entreprendre une meulage sélectif.

En mai 1991, la patiente débute un traitement d'orthodontie majeur. Elle est, semble-t-il, très bien pendant environ trois mois jusqu'en septembre 1991, alors que les douleurs redeviennent intenses au niveau des deux côtés du visage.

En janvier 1992, elle consulte en médecine buccale. Voici les informations recueillies par le spécialiste : on note des douleurs se situant dans la branche montante, ressenties sous forme d'élancements. Ces douleurs s'accompagnent de craquements des articulations temporo-mandibulaires et d'une limitation d'ouverture. La patiente souffre aussi de céphalées fronto-temporales bilatérales d'allure serrative et se plaint d'une cervicologie chronique perçue comme un élancement. De plus, elle dit avoir, des douleurs dans les régions scapulaires, douleurs qui irradient elles-mêmes au niveau des deux bras. Elle note enfin des douleurs dans la région thoracique antéro-supérieure.

Elle ne présente ni raideur ni gonflement articulaire pouvant suggérer une arthrite rhumatoïde. Il n'y a aucune évidence de xérostomie ou de xérophtalmie pouvant évoquer un syndrome de Sjögren. La patiente présente un important problème parafonctionnel sous forme de serrement de dents chronique particulièrement sévère la nuit. En outre, elle est, soumise à un stress relativement important depuis plusieurs mois, particulièrement dans son milieu de travail où elle est en conflit avec son employeur à cause d'un ancien accident de travail. La patiente tente enfin de soulager ses douleurs avec du Tylénol.

L'examen intra-oral révèle la présence d'une très belle occlusion Classe I sous traitement orthodontique. Les muqueuses sont d'apparence normale. La palpation intra-buccale révèle une sensibilité bilatérale à la palpation des ptérygoïdiens externes. La palpation des articulations temporo-

mandibulaires s'exécute normalement sans évidence de craquement ou de douleur locale. L'ouverture maximale se chiffre à 27 mm. La palpation des différents muscles masticateurs révèle des zones de douleur importante au niveau du tiers moyen des temporaux et au niveau de la partie profonde du masséter droit. Il existe aussi une certaine sensibilité à la palpation du masséter gauche.

Quant à l'examen du cou, il confirme la présence de zones gâchettes bien caractérisées au niveau des apophyses transverses des vertèbres C4 et C5, du tiers moyen des deux trapèzes, de l'insertion du sus-épineux droit sur l'omoplate et de l'insertion des deux splénus sur le crâne. De petites adénopathies asymptomatiques sont démontrables et la palpation de la région sous-maxillaire droite est quelque peu douloureuse. Les pouls carotidiens sont bien palpés et la thyroïde est de volume normal. Le reste de l'examen est par ailleurs normal à l'exception d'un problème d'acné localisée au niveau du visage.

Au premier rendez-vous, des analyses de laboratoires sont demandées. Soit une formule sanguine complète avec sédimentation, une glycémie, un BUN (Blood Urea Nitrogen), le facteur antinucléaire, le facteur rhumatoïde ainsi que les T4 et TSH (Thyrotropin-Stimulating Hormone). Les résultats de tous les tests de laboratoire s'avèrent normaux.

Le diagnostic retenu est essentiellement celui d'une fibromyalgie à prédominance cervicofaciale. Toutes les explications nécessaires sont données à la patiente sur la nature et le traitement de sa condition. Dans un premier temps un traitement à l'aide de Sinéquan (un antidépresseur) 25 à 50 mg au coucher est entrepris.

La patiente est revue à plusieurs reprises par la suite. Sur le plan médical, les examens de contrôle mettant en évidence la présence de nombreux points gâchettes caractéristiques (épicondyles, trochanters, grands fessiers...) et confirment donc le diagnostic de fibromyalgie. Différents changements sont apportés à la médication. Les douleurs de la patiente sont actuellement parfaitement contrôlées par Zoloft (un antidépresseur) 50 mg au déjeuner,

Fléxéril (un myorelaxant) 10 mg au dîner et Élavil (un antidépresseur) 30 à 40 mg au coucher.

Discussion

Prévalence

La fibromyalgie est considérée comme l'une des conditions rhumatologiques les plus fréquentes. On estime qu'elle affecte trois à six pour cent de la population en Amérique du Nord. Elle atteint les femmes 10 fois plus souvent que les hommes. La fibromyalgie s'observe principalement chez les personnes âgées de 25 à 50 ans, mais des cas ont été recensés à tout âge, même chez des enfants.

Critères de diagnostic

En 1990, le Collège Américain de Rhumatologie a proposé des critères pour le diagnostic de la fibromyalgie.

Ces critères sont :

1. des douleurs diffuses en association avec
2. une sensibilité significative de 11 sites anatomiques spécifiques sur 18, appelés points fibromyalgiques ou points gâchettes, selon les auteurs. (III, 1)
3. l'absence d'anomalies démontrables au niveau des examens de laboratoire.

Les douleurs fibromyalgiques sont diffuses, chroniques et sont réparties de façon symétrique de gauche à droite du corps, du haut en bas de la taille. Cependant, il n'est pas rare que la douleur apparaisse à un endroit particulier et s'étende avec le temps. Plus de 90 pour cent des patients présentent des douleurs au bas du dos, au cou et aux épaules.

Manifestations cliniques

La plainte principale chez la grande majorité des patients est une douleur diffuse. Celle-ci est décrite comme une douleur profonde ou comme une sensation de brûlure, de fatigue ou de parésie. Les points fibromyalgiques sont souvent méconnus du patient, mais peuvent être facilement identifiables à l'examen clinique.

Associés à la douleur chronique, les symptômes les plus caractéristiques de la fibromyalgie sont un sommeil non réparateur, la fatigue

Tableau I

Symptômes associés à la fibromyalgie

Douleurs diffuses
Sommeil non réparateur
Fatigue
Raideurs matinales
Gonflement subjectif
Thermosensibilité
Céphalées
Paresthésie
Dysménorrhée
Dépression
Syndrome de vessie ou côlon irritable
Phénomène de Raynaud

et des raideurs matinales. Chez certains patients, ces symptômes peuvent être suffisamment importants pour évoquer le diagnostic du syndrome de fatigue chronique. Des céphalées chroniques, un syndrome de vessie ou de côlon irritable, une instabilité vasculaire périphérique faisant penser au phénomène de Raynaud, une thermosensibilité (plus souvent le froid) ainsi qu'un état anxio-dépressif peuvent compléter le tableau clinique (**Tableau I**).

Soulignons qu'il existe huit points fibromyalgiques au niveau de la tête et du cou et que la majorité des patients semblent présenter des douleurs temporales et massétériennes pouvant être confondues avec une dysfonction temporo-mandibulaire.

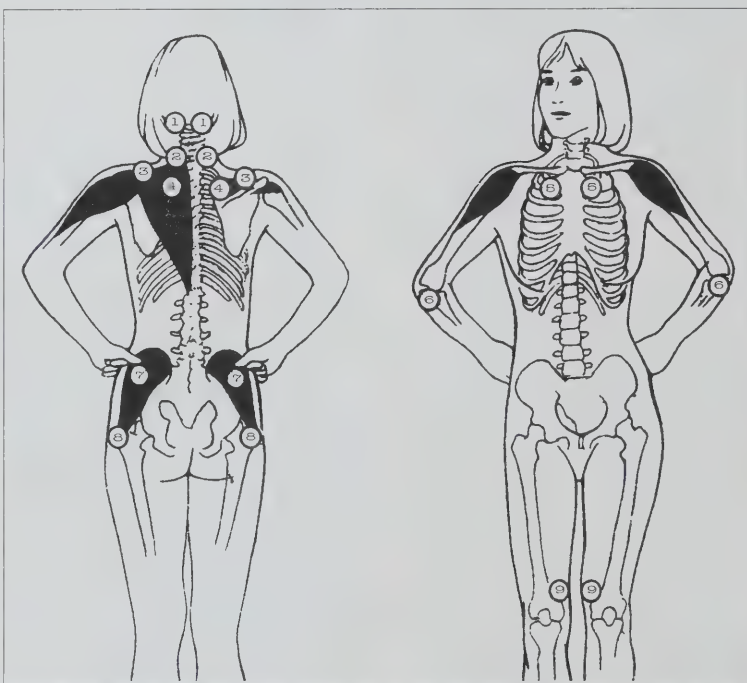
Diagnostic différentiel

Certaines conditions systémiques ou rhumatologiques peuvent être à l'origine de douleurs généralisées semblables à celles qui sont rencontrées dans la fibromyalgie. À l'occasion, ces mêmes désordres systémiques peuvent être la cause de la fibromyalgie, laquelle est alors désignée secondaire par opposition à la fibromyalgie primaire qui survient sans pathologies associées. Les examens de laboratoire et les radiographies sont habituellement normaux dans les cas de fibromyalgie primaire.

La plupart des désordres systémiques reliés à la fibromyalgie peuvent être facilement identifiés par un questionnaire, un examen clinique et des analyses de laboratoire spécifiques. Ces conditions peuvent être importantes dans la précipitation et la perpétuation de la fibromyalgie (**Tableau II**).

Pathophysiologie

Le concept de fibromyalgie a évolué considérablement ces 10 dernières années. Il existe cependant beaucoup de controverses concernant son étiologie, sa pathophysiologie et ses critères de diagnostic. Bon nombre de patients atteints de fibromyalgie ne peuvent déterminer l'événement ou le facteur précipitant de la maladie tandis que d'autres l'associent à un traumatisme, à des fac-



III. 1 : Localisation des points fibromyalgiques: vues antérieure et postérieure

1. région occipitale, insertions musculaires sub-occipitales
2. base cervicale, aspect extérieur du cou, au niveau des apophyses transverses de C5 à C7
3. trapèze, à mi-chemin sur la crête supérieure du muscle
4. sus-épineux, à l'origine du muscle, au dessus de l'épine de l'omoplate
5. 2^e côte, jonction costo chondrale
6. coude, 2 cm distal à l'épicondyle externe
7. fesse, quadrant supéro-externe
8. grand trochanter, postérieur à la proéminence trochantérique
9. genou, coussinet adipeux médian

La découverte de 11 points douloureux sur 18 confirme le diagnostic de fibromyalgie, en l'absence d'anomalies démontrables au niveau des examens de laboratoire.

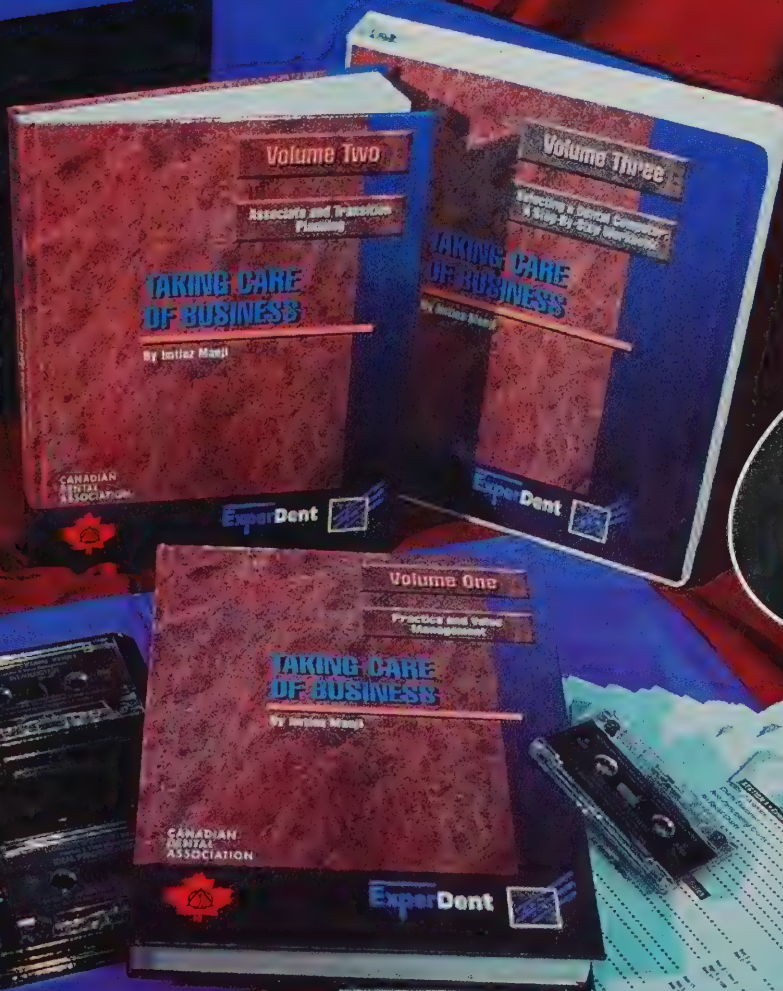
Tableau II

Conditions d'exclusion ou d'association à la fibromyalgie

Syndrome de fatigue chronique
Syndrome de douleur myofasciale
Ostéoarthrite
Arthrite rhumatoïde
Lupus érythémateux systémique
Polymyalgia rheumatica
Polymyosite
Spondylarthrite
Hypothyroïdisme
Désordres neurologiques
Néoplasie métastatique



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Tableau III

Symptomatologie des douleurs myofasciales

Douleur sourde, lancinante parfois étendue et irradiée à distance
Douleur à la mastication
Limitation d'ouverture
Raideur, tension
Céphalée
Otalgie
Cervicalgie

teurs psychosociaux ou encore à une maladie infectieuse ou virale.

La littérature semble mettre en évidence certains mécanismes qui seraient en cause. En voici quelques-uns :

1. Métabolisme musculaire : des anomalies de la micro-circulation et du métabolisme musculaire des muscles ont été démontrées par des études histologiques et électromyographiques. Ces changements sont facilement démontrables, mais ne sont pas révélateurs d'un processus pathophysiologique spécifique.
2. Altérations biochimiques : des changements biochimiques prenant place dans le liquide céphalo-rachidien semblent un champ intéressant et suggèrent l'existence de relations significatives avec la fibromyalgie. Ces changements biochimiques toucheraient plus spécifiquement des neuropeptides tels la substance P et des peptides opioïdes comme l'endorphine qui jouent tous deux un rôle dans la modulation de la douleur.
3. Dysfonction immunitaire : cette ligne de pensée est le résultat d'une constatation voulant que la fibromyalgie soit souvent observée chez des patients ayant une dysfonction immunitaire tel le syndrome de Sjögren, l'arthrite rhumatoïde, l'hypothyroïdie et le lupus érythémateux. Certains auteurs prétendent que la fibromyalgie

pourrait être le résultat d'un processus infectieux menant à un dérangement chronique du fonctionnement du système immunitaire et de la régulation des mécanismes du sommeil. L'hypothèse d'une dysfonction immunitaire n'a cependant jamais été confirmée scientifiquement.

4. Anomalie de la physiologie du sommeil : la présence d'un sommeil non réparateur constitue un trait prédominant de la fibromyalgie. Le stade 4 du sommeil non REM (Rapid Eye Movement) est considéré par la présence d'ondes delta. Le dérangement de ce sommeil par l'intrusion d'ondes alpha est caractéristique d'un état d'éveil. Un sommeil « alpha-delta » est reconnu pour correspondre à une fatigue subjective et à un inconfort physiologique. La sérotonine est un neurotransmetteur jouant un rôle dans la régulation du sommeil et la perception de la douleur. Une déficience en sérotonine pourrait expliquer les anomalies du sommeil de même que le seuil de douleur abaissé chez les patients fibromyalgiques.

Les points gâchettes de la fibromyalgie vs les points gâchettes des douleurs myofasciales

Un certain chevauchement entre les douleurs myofasciales et la fibromyalgie causent des confusions majeures chez la plupart des cliniciens. Plusieurs termes dans ces deux syndromes sont similaires et ambigus : les points gâchettes de la fibromyalgie (points fibromyalgiques) et les points gâchettes de la douleur myofasciale, les douleurs diffuses et les douleurs référées.

Les points gâchettes de la fibromyalgie sont généralement situés au niveau du muscle ou à l'insertion muscle-tendon. Ces points sont plus sensibles que les autres parties du corps du patient. Ces points fibromyalgiques ne possèdent pas de zone de contracture, c'est-à-dire qu'il n'y a aucun gonflement musculaire ou rétrécissement des fibres appréciable à la palpation. La douleur reste localisée, elle ne s'étend pas

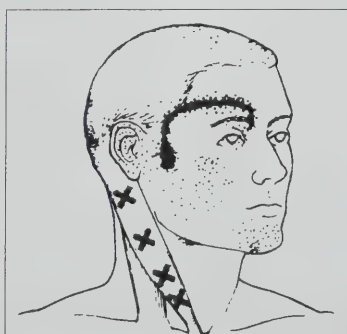
et n'irradie pas à distance. Ceci permet de distinguer les points fibromyalgiques des points gâchettes de la douleur myofasciale.

Le syndrome de douleur myofasciale a été défini de façon empirique comme étant des douleurs musculo-squelettiques localisées à une ou plusieurs zones hyperirritables, localisées dans les muscles, tendons ou fascias. La zone hyperirritable est appelée point gâchette à cause de sa propension à induire une douleur référée à un endroit de distribution spécifique. (III. 2)

Par contre, le point gâchette peut être actif ou silencieux. Un point gâchette actif sera sensible à la palpation et donnera naissance à une douleur dans une zone de référence tandis que le point gâchette silencieux pourra être détecté cliniquement, mais ne sera pas sensible à la palpation.

Les caractéristiques cliniques de la douleur myofasciale représentent une douleur relativement locale, associée à une zone de contracture d'un muscle par laquelle on peut identifier à la palpation. La technique de palpation pour localiser les zones gâchettes au niveau des muscles masticateurs se fait par une pression digitale, circulaire au niveau de la zone affectée. Le point gâchette en question est souvent distant de la douleur dont se plaint le patient.

Les douleurs myofasciales correspondent généralement à des douleurs sourdes, lancinantes, parfois étendues et irradiantes. La douleur peut être aggravée par la mastication et elle peut être accompagnée d'une limitation d'ou-



III. 2: Patron de douleur référée avec points gâchettes correspondants, au niveau du muscle sternocléidomastoïdien, chez un patient souffrant de douleur myofasciale



verture, de raideur, de tension, de céphalées, d'otalgie, de cervicalgie et/ou d'odontalgie (**Tableau III**).

Dans sa forme la plus simple, la douleur myofasciale est due à un point gâchette. Si celle-ci ne régresse pas de façon spontanée ou n'est pas traitée efficacement, d'autres points gâchettes peuvent apparaître dans le même muscle et dans les muscles adjacents, résultant en un syndrome de douleurs myofasciales régionales plus complexes et secondairement en un tableau de douleurs chroniques généralisés. Il n'est pas rare qu'un patient souffrant de douleurs myofasciales étendues progresse avec le temps vers un tableau clinique identique à la fibromyalgie. On soupçonne même que certains patients souffrant de fibromyalgie ne sont pas immunisés au développement de points gâchettes et c'est à se demander si certains points fibromyalgiques ne sont pas en effet des points gâchettes semblables à ceux que l'on retrouve dans les douleurs myofasciales.

Conclusion

Il y a des signes évidents de similitudes entre les douleurs myofasciales et la fibromyalgie, la plus évidente étant les points gâchettes, reconnus comme des zones d'hypersensibilité à la palpation. Plusieurs des caractéristiques cliniques de la fibromyalgie comme la fatigue, les raideurs matinales, une susceptibilité à un état dépressif et un sommeil non réparateur peuvent aussi accompagner les douleurs myofasciales (plus souvent chez des patients avec un syndrome complexe de douleurs myofasciales). La plupart des auteurs s'entendent pour reconnaître que se sont deux désordres distincts, mais qui peuvent avoir certains éléments en commun sur le plan pathophysiologiques.

Le dentiste devra être sensibilisé aux symptômes associés à la fibromyalgie. Le Collège Américain de Rhumatologie reconnaît déjà huit points fibromyalgiques au niveau de la tête et du cou. Ces douleurs peuvent facilement être confondues avec des désordres temporo-mandibulaires puisqu'un nombre important de patients souffrant de fibromyalgie ont des

douleurs musculaires de la région temporales et massétériennes.

Un diagnostic précoce de fibromyalgie est important étant donné les considérations multifactorielles. Toute approche, qu'elle soit psychologique, environnementale, physio ou pharmacothérapeutique exige la connaissance de ces facteurs. ■

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Dr Sylvie Louise Avon est responsable de formation pratique à la faculté de médecine dentaire, Université Laval.

Demande de tirés à part : Dr Sylvie Louise Avon, faculté de médecine dentaire, Université Laval, Ste-Foy (Québec) G1K 7P4.

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This month, the CDA Resource Centre has developed a package of articles of interest to dentists on **HOME BLEACHING**. The package is available to CDA members for \$5 and to non-members for \$10, plus applicable taxes.

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Nanda, R. [guest editor] "Adult orthodontics 1". *Dental Clinics of North America*, v.40(4), October, 1996.

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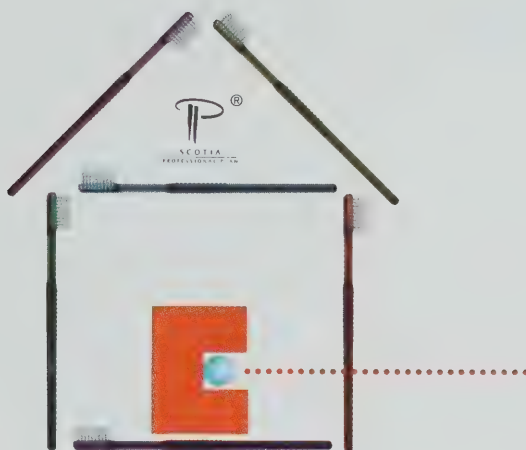
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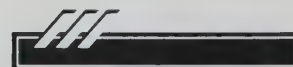
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If you practise as an associate, you now have new office cover-

age available to you, with a more economical premium. The TripleGuard Associate Package provides the same unlimited practice interruption coverage and \$2 million of comprehensive general liability coverage as the regular TripleGuard plan. However, where the regular plan has a minimum of \$50,000 of office contents coverage, the TripleGuard Associate Package provides \$15,000 of coverage. This amount reflects an associate's smaller investment in dental instruments and equipment.

On the subject of TripleGuard, a change was made to data processing coverage this year. At the start of 1996, basic coverage amounts were provided for the three areas of computer equipment, software and data, and extra expenses. For an additional premium, you received extra protection for any one area. All of these areas now fall under office contents coverage, the same way all other items belong to office contents coverage. In other words, once you've calculated your office contents amount, there is no extra data processing coverage to purchase. Also, \$50,000 of practice interruption insurance used to be provided for data processing claims. Now, for such claims, you receive unlimited practice interruption coverage.

One last insurance change to report. During 1996, Canadian Dental Service Plans Inc. (CDSPI) introduced another payment option — monthly credit card payments. If

you choose this option, payments are automatically charged to your credit card monthly and you are invoiced annually. Participants can now pay annually or quarterly by cheque, monthly through pre-authorized chequing, or annually, quarterly, or monthly by VISA or MasterCard.

Important Improvements To The CDA RSP

An important change was made to the CDA RSP's eligibility requirements this year. Anyone in the dental profession who is eligible to join the CDA RSP can now offer the benefits of the plan to immediate family members. This includes an eligible person's spouse, children, parents, brothers and sisters, grandchildren, grandparents, and in-laws. Unless your family members are eligible for another Registered Retirement Savings Plan from a non-profit organization, they are unlikely to find an RRSP with fees as low as the CDA RSPs. Remember, there are no front-end or back-end loads, no fees for transferring money from one fund to another — absolutely no sales or service fees. Just an extremely low management fee of 1.45 per cent or less.

Also, two new equity funds have been added to the CDA RSP. In fact, these funds are extremely new — they were launched this month (November). The Special Equity Fund is a "concept" or "best idea" fund, which means the fund manager has a great deal of

freedom in choosing stocks. This fund invests in companies that have great potential for growth. More emphasis is placed on small companies, but medium and large companies are included when they present strong growth potential. Examples of companies in the current portfolio are MacMillan Bloedel, Extencicare, Fairfax, Trimark, and Second Cup.

The second new fund, the U.S. Equity Fund, enables investors to further diversify their international contributions, and offers significant growth potential. U.S. equities represent more than 40 per cent of the world equity market, and U.S. equity markets offer the broadest selection of growth stocks of any market. Historically,

U.S. equity markets have outperformed Canadian equity markets.

One more development took place at CDSPI in 1996. The administrator of your financial security programs established its own Web site on the Internet at <http://www.cdspi.com>. You can visit CDSPI's Web site on your office or home PC for helpful information on the dental profession's insurance and investment programs and for up-to-date information on new programs and services from CDSPI as they develop.

Program Changes For 1997

The end of the year is also insurance renewal time. Overall, the Canadian Dentists' Insurance Program plans for 1997 are generally the same as they were in 1996.

Plans with the same premiums and coverages are basic life insurance, dependents' life insurance, accidental death and dismemberment insurance, legal expense insurance, and personal umbrella liability insurance.

However, a few changes have been made to other plans. On the personal side, long-term disability insurance premiums will increase by five per cent, reflecting higher claims experience. As well, the future insurance guarantee option premium will increase.

Although Paul Revere and other insurers no longer offer dentists the "own occupation" option under long-term disability coverage, your program still offers this valuable option for 1997, though the



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CDA Fund Performance (for period ending September 30, 1996)[†]
(Checks indicate Superior Performance Compared to Industry Averages.*)

CDA Fund	1 Year		3 Year		5 Year		10 Year	
	CDA	Other*	CDA	Other*	CDA	Other*	CDA	Other*
Aggressive Equity	23.0%	28.4%	n/a		n/a		n/a	
Common Stock	6.3%	18.5%	6.3%	10.2%	9.2%	11.7%	8.5%	8.7%
Balanced	✓ 14.8%	13.7%	✓ 9.5%	8.8%	10.1%	10.4%	✓ 9.2%	8.5%
Bond & Mortgage	✓ 10.9%	10.2%	✓ 7.9%	7.0%	✓ 9.9%	9.1%	✓ 10.0%	9.4%
Money Market	✓ 5.4%	4.7%	✓ 5.6%	4.9%	✓ 5.9%	5.3%	✓ 7.9%	7.6%
International Equity	10.6%	11.7%	n/a		n/a		n/a	
European	14.2%	16.3%	n/a		n/a		n/a	
Pacific Basin	✓ 10.0%	3.7%	n/a		n/a		n/a	
Emerging Markets	2.5%	11.3%	n/a		n/a		n/a	

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historic rates based on past performance and are not necessarily indicative of future performance.

* Comparison performance figures are Globe and Mail averages for the range of similar funds offered in the marketplace before sales charges, as published in the October 17, 1996 issue.

For current unit values and GIC rates call CDSPI toll-free at: 1-800-561-9401, ext. 525.



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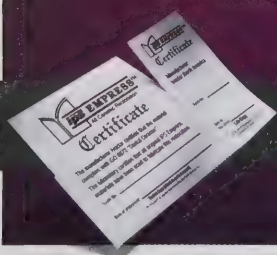
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"A Void In U.S. Restorative Dentistry,"
JADA, Vol. 126, (February, 1995), 244-245

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Reality, Vol. 9, (January, 1995)



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premium will be higher. Travel insurance premiums increased July 1, 1996, but the plan remains one of the best deals — if not *the* best deal — you're likely to find. Premiums for the hospital cash insurance plan will also increase for 1997.

On the office side, the basic premium for office overhead expense insurance will be lower for 1997, but the premium for the "own occupation" option will be increased. The total premium for most participants who choose "own occupation" will be about the same as last year's. Due to higher claims experience, TripleGuard premiums will increase by five per cent. However, new for 1997, dentists can choose lower-cost TripleGuard insurance with

the same coverage, but with a \$1,000 non-disappearing deductible (participants pay the deductible on all claims).

Malpractice insurance will now offer five more levels of additional coverage, to a maximum limit of \$10 million per claim and a maximum of \$30 million in a calendar year. Malpractice insurance premiums are being increased by three per cent.

The dental office staff insurance package is being enhanced with a dental care option and extended health care option. (Some provincial restrictions on availability apply.)

If you participated in the program's basic life insurance or office overhead expense insurance plans during 1995, you may be getting a cheque in the mail. Since

both plans had stable claims experience, the surplus amounts in these plans will be distributed among most participants.

Full details on plan changes will be mailed to all participants in the Canadian Dentists' Insurance Program well before your renewal date.

If you would like more information on any of the 1996 improvements outlined earlier, call CDSPI at 1-800-561-9401, or (416) 296-9401 in Metro Toronto. To speak with an investment administrator, call extension 253, 255, or 256. For insurance matters, call a personal service representative at extension 236 for Western provinces, 238 for Ontario, and 234 for Quebec and the Atlantic provinces. ■

ABSTRACT

Gallium-Based Restorative Material: An Evaluation Of Clinical Performance and Mechanical Properties

Silver-based amalgam has enjoyed a long period of favor in dentistry. Current concerns over mercury exposure from amalgam have resulted in a search for a substitute restorative material that possesses the durability, cost effectiveness and ease of use that amalgam has. This study evaluates a gallium-based alloy (Galloy) over a one-year period. The results of this short term study show promise that gallium will prove to be a suitable substitute for silver amalgam.

Gallium was first considered as a restorative material for dentistry in the 1920s. The low cost and predictability of silver amalgam resulted in its predominance in restorative dentistry. In this study, gallium-based restorative material was compared to two different high copper silver amalgam alloys. The criteria evaluated were tensile strength, compressive strength, creep, hardness, wear and dimensional stability. All three alloys were prepared and placed in preparations in dies according to the manufacturers' directions.

The evaluation of the mechanical properties of the alloys showed that the gallium alloy had more than 30 per cent greater tensile strength and showed 10 times less wear than high copper alloys. The results from the tests of the compressive strength, creep, hardness and dimensional stability of the gallium alloy showed that it would meet the criteria necessary to pass the American Dental Association's specification tests.

The clinical performance of gallium was measured over a one-year period. Thirty gallium alloy restorations were placed in nine patients in good health. All preparations were as conservative as possible and the restorations were placed using rubber dam.

One-half of the restorations were placed with a resin material as a lining agent and the other half were placed using a bonded resins system (Amalgambond). The gallium alloy was placed and carved and a gallium alloy resin was then applied and cured.

After three months, there was no resin found and little or no marginal breakdown seen. At this

time, there were no material failures evident and there was no significant difference between the restorations placed with resin liners and those placed with the bonded amalgam system.

The clinical results were similar at six months and at one year.

It appears that the gallium based alloy has many clinical and mechanical properties which are similar to, or better than, amalgam. There were no significant problems seen after one year of clinical study.

These results are from a short-term study and longer clinical trials are necessary before this material can be considered acceptable for use in restorative dentistry. It should be noted that gallium alloys have not yet been approved for use in clinical dentistry. It is likely that the use of gallium alloys will prove to be a viable alternative to amalgam for patients and dentists who wish to avoid mercury exposure. ■

Osborne J.W. et al: *Oper Dent* 20: 241-245, 1995.

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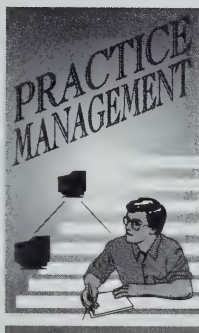


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PRACTICE MANAGEMENT & SUCCESS



A Clean Break: Exiting Dental Partnerships

Imtiaz Manji, B.Sc.

In my last article, I said that for owner-dentists, the sale of the dental practice is one of life's certainties. Here's another: sooner or later, for one reason or another, every dental partnership will end. Often, dental partnership agreements don't reflect this certainty. It is important to consider this fact, because a contentious break-up has on-going implications that can cause financial and/or mental distress to both parties.

Dental partnerships come in a variety of forms, ranging from true partnerships, where everything is co-owned, to facility partnerships, where the only things that are shared are the office space and rent.

Since partnerships have a limited lifespan, it makes sense for the partners to plan from the outset under what conditions they can exit from the arrangement. This kind of planning is frequently overlooked. In the heady, optimistic days when a new partnership is formed, ending it is often the furthest thing from the prospective partners' minds.

Exit planning isn't easy. It calls for a delicate balancing act between a partner's ability to get out of an arrangement that is no longer satisfactory, and ensuring the stability necessary for a partnership to be functional.

Partnerships that are too easily dissolved are too fragile to survive. What dentist would even want to enter into an arrangement if the partner could walk out at any moment, leaving him or her to bear the full expense of the facility? On the other hand, partnerships that are too rigid are equally undesir-

able. I have seen partnership agreements where the only way out is for the departing dentist to walk away with literally nothing, virtually abandoning his or her entire investment in the practice.

There is no single right way to plan for an exit from a dental partnership. Although breaking up a partnership is frequently traumatic, the key to achieving the most mutually-agreeable break possible is to select the option that best suits the situation, and build it into the agreement from the outset.

The reasons for exiting a partnership can be grouped under three main headings: leaving by choice, involuntary departure, and leaving by reason of death or disability.

Leaving Partnerships by Choice

There are many reasons why dentists choose to exit a partnership: moving, going back to school, finding better opportunities elsewhere, or discovering they aren't as compatible with their partners as they thought. Whatever the reason, ending a partnership involves two key issues — the responsibility for the shared costs of the partnership and the division of the partnership's assets.

Two traditional methods are often used to facilitate departure from partnerships by choice. There are many variations on the basic themes, however, since the mechanics of each method can be altered considerably to meet the needs of particular situations.

Right of First Refusal

This clause in a partnership agreement gives the dentist who remains in the partnership the right to decide whether to buy the leaving dentist's share in the practice. Usually, the process is initiated by the selling partner obtaining a third-party offer, which the remaining partner is given the opportunity to match.

A right of first refusal can be used to cover either the physical assets of the practice alone — if one dentist wishes to move and treat his or her patients from a new location, for example — or the entire practice. In the latter case, the partnership agreement should include a restrictive covenant to protect the buyer's goodwill.

For remaining dentists, the main advantage of this clause is that departing dentists have to replace themselves before they leave. This means that there is an orderly and predictable quality to the break-up. It also ensures that someone will be in place at all times to help cover practice overheads. Another advantage for remaining dentists, should they exercise their option, is that they have some control over who buys the practice. They may be able to choose a practitioner with whom they feel comfortable working. The alternative is to work with someone who may have an incompatible personality or dental philosophy.

A disadvantage for sellers is that the remaining dentist can impede or even prevent a sale by being uncooperative or deliberately unpleasant. In the event of a sale, a clause requiring partners to dis-

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play cooperative attitudes can be built into the partnership agreement. In practice, however, such clauses are difficult to enforce.

Notice

By this method, the dentist who wishes to leave the partnership gives sufficient notice — anything from six months to a year — for his or her partner to take control of the entire facility, or make other partnership arrangements. Some mechanism is required to dispose of shared assets, such as a mandatory buy-out at fair market value or some fixed amount.

The dentist remaining in the partnership will either have to find a new partner or face a drastic increase in costs. However, the latter eventuality can be offset by a clause whereby the departing dentist agrees to pay his or her share of the rent and other fixed overhead costs for a certain period, or until a replacement is found. Although this creates a major disincentive for dentists to leave the partnership in the first place, it is a useful counterweight to the ease with which departing dentists can exit a partnership by giving notice. Partnerships must have stability, and making it too easy to leave undermines this quality.

Retirement

Retirement is often treated separately in partnership agreements, since the dentist is not only leaving the partnership but the profession as well. In general, the same departure methods apply for retirement. However, since it is known from the outset that the entire practice will be up for disposal, long-range planning is possible. Partnership agreements can take advantage of this by including phased retirement plans, where patient transfer occurs over time. The retiring partner cuts down on his or her hours of work in the practice and the remaining partners take over by mandatory buy-out according to an agreed-upon formula.

Although retiring dentists can opt for partnership agreements where they are responsible for the sale of their practices, many prefer the stability and security provided by structured buy-out provisions.

Involuntary Departure

Dentists who are in the process of entering into partnerships should consider how they will rid themselves of a partner who proves undesirable due to unscrupulousness, professional negligence, loss of licence, or some other reason.

Forced Exit With Mandatory Buy-Out

One method to achieve a forced exit is by a clause in the agreement that provides the legal right for one partner to dismiss another for just cause. The clause should spell out clearly the conditions for dismissal, the terms of departure, and a time frame. Such provisions may not be feasible or necessary in simple cost-sharing arrangements, but are extremely important in more integrated relationships, where the reputation and goodwill of the practice as a whole is affected by the conduct of each partner.

The terms of the dismissal clause should specify how the assets and goodwill of the dentist who is leaving are to be disposed. Since in these circumstances a clean break is highly recommended, a mandatory buy-out by the remaining partner is usually the only feasible solution. Although the sudden commitment to finance a purchase and the unshared overheads will create a burden for the remaining dentist, at least until a sale or associate can be arranged, it may be a worthwhile investment to save the practice.

Shotgun Clause

Another method that can be used to force the termination of a partnership is the shotgun clause. This clause allows either partner to present a practice value to the other party, who must either buy out the partner for this amount or sell his or her interest in the practice for this amount. It's a similar concept to the "I'll cut, you choose" method of sharing an apple. The clause can apply to the practice as a whole, or to the partner's interest in the practice's tangible assets.

On the face of it, this clause seems to ensure a fair and final set-

tlement. In reality, however, it can impose real hardship in cases where there are fundamental differences or inequalities between partners. For example, consider a partnership between Dentist A, who has been in practice for 15 years, and Dentist B, who has been in practice for one year and recently bought 50 per cent of Dr. A's practice. Dr. A invokes the shotgun clause, naming a price that is considerably less than the practice is worth but much more than Dr. B can raise. The result? Dr. B has no choice but to sell his half of the practice at a loss.

Consider also a case where Dr. A has been practising for 25 years and wants to retire in three years. If Dr. B invokes the shotgun clause, Dr. A will be faced with the unattractive options of retiring early or making a major purchase very late in his or her career.

Where there are more than two partners, a shotgun clause can become positively iniquitous. Combined, Drs. A, B, and C may easily be able to buy out Dr. D, who alone will never be able to buy out the other three. The result is essentially a mechanism where a partner can be functionally dismissed, and forced to sell at a far lower price than the practice is worth. Surprisingly, this scenario is not uncommon in partnership agreements.

When considering exit provisions for your own partnership agreements, it may be wise to keep in mind that, even when tempered by a long closing date, say 90 days or more, the shotgun clause is a drastic way to end a partnership. This is the best option in only a limited number of cases.

Death and Disability

The possibility of the death of a dental partner is a constant that should be dealt with in most partnership agreements. As well, it is in the interests of every dentist to ensure that, in the event of his or her own death, the value of the practice is protected, the practice is liquidated, and the proceeds from the sale go to his or her estate. The best way to ensure this is through buy/sell insurance — i.e., policies that partners take out on each other's lives. The insurance pay-out is used by the sur-

viving partner to buy the deceased's share of the practice. In all cases, the amount of insurance should be specified in the partnership agreement or determined from time to time by the partners. The value of the insurance may be used to dictate the purchase price of the practice.

An alternative is that the buy-out is at fair market value. If the insurance does not cover this amount, the surviving partner must make up the difference. If the insurance value is greater, then the residual is paid to the deceased's estate.

Provisions should also be made to cover the possibility that the buy/sell insurance is invalidated for some reason. One way is to specify that where the insurance proves to be invalid, the buy-out still occurs but for a nominal sum. Where insurance coverage is denied from the outset, whether due to health or other reasons, the partners might want to consider developing a mutually-agreeable buy-out formula. This may take the form of a set purchase price and

payment schedule, or some other orderly arrangement.

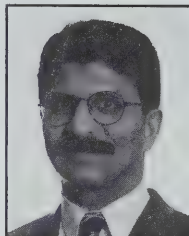
Disability is another reason for terminating a partnership and, as in the case of death, provisions on how this is to be handled should be specified in the partnership agreement. Income protection and long-term disability insurance are musts for self-employed dentists, but disability buy-out insurance, while desirable, is often expensive. In the absence of such insurance, agreements should provide a mechanism — right of first refusal or mandatory buy-out clauses, for example — that deals with the coverage of shared costs and the division of assets. Buy-outs can be at fair market value or some other mutually-agreed formula. A payment schedule is often specified.

Conclusion

Partnership agreements must balance the need for stability and dependability with the right of participants to exit partnerships for a host of reasons. A partnership where no thought has been given to these is-

sues can collapse in chaos, causing serious and long-lasting financial harm to the dentists involved. It is important for prospective partners to involve expert advisors in the negotiation and drafting of their agreements. These advisors can build in provisions to cover a wide range of exiting contingencies. It may seem odd to devote time and energy to planning the end of a partnership when the future partners

are so heavily focused on getting it started in the first place. But when the time comes for a partnership to end — and it will — those clauses that provide for a clean and orderly break will be worth their weight in gold. ■



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SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1996-97 quiz will appear in the June 1997 issue of the *Journal*. Answers to the quiz will be published in the August 1997 issue. Dentists who complete the quiz may be eligible to receive continuing education points, and their names will be forwarded to their provincial licensing bodies for consideration.

Questions 6 through 10 are a repeat of the questions that appeared in the October issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 11 through 15 are new questions — watch for the answers and rationales next month. Keep all copies of the *Journal* so you can correctly respond to the June 1997 quiz.

QUESTION 6

Panoramic tomography, when compared to full mouth intraoral radiography, exposes the patient to

- A. a higher radiation dose.
- B. a lower radiation dose.
- C. the same radiation dose.

ANSWER: B

RATIONALE:

It should be noted that several investigators have reported on an increased risk to malignant parotid salivary tumours associated with dental radiation. White³ reported a tenfold increased risk of developing intraoral cancer from intraoral full mouth surveys as compared to panoramic examination.

Gonadal dose from a full mouth survey ranges from 2-20 milligrays (mGy) with a protective lead apron in place. This equates to a whole body equivalent exposure of 0.02 mGy as compared to 0.005 mGy for panoramic tomography. The reason for this is that the narrow slit beam of radiation is directed upwards at an angle of five to seven degrees in the panoramic technique.

For conventional x-ray units an increase of the kVp from 70 to 90 will result in a reduction of 20 to 23 per cent radiation of the superficial soft tissues. The use of a long cone is also beneficial in this regard. Even though the exposure time with the long cone is four times greater the area of soft tissue bombardment is less. Fur-

ther a fast film such as Kodak Ectaspeed plus will reduce exposure time by 40 to 50 per cent.

Langlais^{1,2} indicated that with proper technique a panoramic radiograph is clinically as effective as a full mouth survey for the diagnosis of interproximal caries, the level of alveolar bone in periodontal disease as well as periapical disease of pulpal or periodontal origin. The selection of a panoramic radiograph over a full mouth survey will give a significant saving in patient radiation dosage without compromising diagnostic benefit. In such a selection the radiation dose to the patient is reduced tenfold.

However, the technique of panoramic tomography, because of the rotational axes of the machine, will bombard the centre of rotation to a level of up to 10 mGy and this must be remembered if the apparatus is of the older type such as Panorex. Modern tomographic machines now have moving centres of rotation to counteract this radiation hazard.

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- 3) White, J.C. 1992 Assessment of radiation risk from dental radiography. *Dentomaxillofac Radiol* 21:118-126, 1992.

QUESTION 7

Which of the following cements provide(s) the best seating and retention for complete crowns?

1. Zinc oxyphosphate.
 2. Conventional resin cement (Comspan).
 3. BIS-GMA composite resin cement (Panavia).
- A. (1) only
 - B. (2) only
 - C. (3) only
 - D. (1) and (2)
 - E. (2) and (3)

ANSWER: E

RATIONALE:

In a study involving zinc oxyphosphate, conventional resin and BIS-GMA composite resin cements, the retentive properties of cast gold crowns cemented with all three cements were compared. Panavia cement exhibited a retentive strength twice that of oxyphosphate cement. The difference between the two resin cements, Comspan and Panavia was not statistically significant.

Panavia is a filled BIS-GMA composite resin which differs from conventional resin cement. BIS-GMA stands for bisphenol A-glycidyl methacrylate. It has a low film thickness (19 microns) and a compressive strength two times that of oxyphosphate cement. Furthermore, it has virtual insolubility in oral fluids.

Seating of crowns with the resin cements was more favorable than with zinc oxyphosphate cement. It is thought that resin cements have a lubricating effect reducing friction between the casting and the tooth, thus contributing to improved placement of the crown.

A recent study² in which the seating accuracy of vented and non-vented crowns was compared using zinc oxyphosphate, glass ionomer and composite resin cements confirmed the above findings. Therefore, composite resin cements enhance both the seating and retention of full crowns and are recommended.

REFERENCES:

- 1) Tjan, Anthony H.L. and Li, T. Seating and retention of complete crowns with a new adhesive resin cement. *J Prosthet Dent* 67:478-487, 1992.
- 2) Clark, M.T., Richards, M.W. and Meiers, J.C., Seating accuracy and fracture strength of vented and non-vented ceramic crowns luted with three cements. *J Prosthet Dent* 74:18-24, 1995.

QUESTION 8

The use of porcelain laminates is CONTRAINDICATED for

1. teeth in parafunction.
 2. closure of a 1.0 mm diastema.
 3. teeth with fluorosis.
 4. heavily restored teeth.
- A. (1) and (2)
 - B. (1) and (4)
 - C. (2) and (4)
 - D. (2) (3) (4)

ANSWER: B

RATIONALE:

Porcelain veneers are the restorations of choice to improve esthetics provided tooth discoloration is not gross nor the teeth heavily restored. A small diastema of 1.0 mm is readily controlled by placing veneers upon teeth on either side of the space. Fluorosis is easily masked by a veneer since a laminate exhibits a natural fluorescence and absorbs and transmits light like natural tooth structure. The porcelain veneer is, however, contraindicated for teeth in parafunction or where bruxism can be detected since in these circumstances the veneer will either fracture or become detached.

In dealing with laminates controversy exists as to whether the incisal edge of the tooth to be veneered should be overlapped or not. A study by Nordbo et al¹ of 135 veneers, in which the laminate did not extend over the incisal edge, found that all veneers were retained after three years. These results using the more conservative preparation proved to be both predictable and successful.

A study by Pippin et al³ compared porcelain veneers to porcelain fused to metal crowns. The results demonstrated that not only were veneers the restorations of choice for esthetic purposes but that the gingival health and a lessened susceptibility to secondary caries was a further benefit of the veneer.

REFERENCES:

- 1) Nordbo, H., Rygh-Thoresen, N. and Henang, T. Clinical performance of porcelain laminate veneers without incisal overlapping: 3-year results. *J Dent* 22:342-345, 1994.
- 2) Rucker, L.M., Richter, W., MacEntee, M. et al. Porcelain and resin veneers clinically evaluated: 2-year results *JADA*; 121:594-596, 1990.

- 3) Pippin, D.J., Mixson, J.M. and Soldan-Els, A.P. Clinical evaluation of restored maxillary incisors: veneers vs PFM crowns. *JADA* 126:1523-1529, 1995.

QUESTION 9

For the treatment of a patient with advanced adult periodontitis you would

- A. perform scaling/root planing concurrently with a systemic antimicrobial.
- B. prescribe an antimicrobial for one week and then perform scaling/root planing.
- C. perform scaling/root planing and one week later prescribe a systemic antimicrobial.
- D. perform scaling/root planing only.

ANSWER: C

RATIONALE:

Two recent studies have shown beneficial results in treating advanced periodontitis in the adult patient. Both metronidazole and spiramycin were found to be highly satisfactory antimicrobials when given systemically.

The metronidazole study addressed all of the clinical choices given above. Patients were assigned randomly to systemic metronidazole (250mg three times/day) or a placebo for one week.

The study with spiramycin had a similar protocol, but the placebo or the drug was administered for 14 days. The dosage of spiramycin was 3,000,000 I.U. per day (two capsules of Rovamycin '500').

All patients were over the age of 35 and had clinical and radiographic evidence of periodontal diseases. At least two sites had pockets of 7 mm or more and at least 15 teeth were present.

Results were in favor of initial mechanical debridement, i.e. scaling and root planing, followed by systemic antimicrobial administration.

By way of explanation, debridement before the antimicrobial, allows the ratio of the agent to the microbial cell in the pocket to be more favorable after debridement. Scaling and root planing reduces the microbial load in the pocket. Since the antimicrobial flows into the pocket in the gingival crevicular fluid, the drug potency against remaining microbes is made the more effective.

There was a distinct reduction of pocket depth in both studies and the need for surgical intervention was markedly reduced to the benefit of patient care.

REFERENCES:

- 1) Loesche, W.J. and Giordano, J.R. Metronidazole in periodontitis V: Debridement should precede medication. *Compendium* 15(10):1198-1218, 1994.
- 2) Bain, C.A., Beagrie, G.S., Bourgain, J. et al. The effects of spiramycin and/or scaling on advanced periodontitis in humans. *J Can Dent Assoc* 60:209-217, 1994.
- 3) Nikiforuk, G. *Oral Care Report* Vol. 4, No. 4, 1994.

QUESTION 10

A patient comes to you for a second opinion because she has been told that the amalgam restorations in her mouth are toxic and therefore should be removed. You would advise her

- A. to consult with a dermatologist.
- B. to consult with an immunologist.
- C. to have all amalgams removed and replaced with alternative materials.
- D. that no evidence exists to show that amalgam restorations are toxic.

ANSWER: D

RATIONALE:

There are no substantiated studies or case reports published in refereed scientific journals supporting the claim that dental amalgams are the cause of mercury toxicity. There are no data to suggest that the removal of amalgam restorations should be performed in an attempt to treat patients with non-specific chronic complaints.

A study on mercury content in amalgam restorations concluded that little loss of mercury from the original restorations could be detected on their removal. Because of the recognized ability of mercury to vaporize and therefore to contaminate a dental office, it is essential to stress the need for control of free mercury. As a group, dentists and dental assistants have a much higher level of exposure to mercury vapour than a patient with a large number of amalgam restorations. Therefore, it should be possible to demonstrate that dentists and dental assistants have a significantly higher prevalence of symptoms and disorders known to be associated with mercury exposure. In fact, examinations of the health, mortality and morbidity rates for dentists have shown that they are not significantly different from those of the general population.

Because the process of removing amalgam restorations would inevitably lead to a significant increase of mercury levels in the body, it is not unreasonable then to suppose that this would result in an increase in the se-

verity of a patient's symptoms rather than the dramatic disappearance of severe symptoms as has been claimed anecdotally. This simple logic seems to have escaped the people who have reported immediate and miraculous recoveries following amalgam removal.

In exceedingly rare circumstances, an individual may possibly exhibit a true sensitivity or allergy to mercury. Such patients should be referred to allergists or dermatologists for appropriate testing. Certain cases of oral lichen planus may resolve or show significant improvement subsequent to the removal of adjacent amalgam restorations.

A recent report⁴ in which 1,462 people were followed over a 20 year period has provided some interesting information. Comparison was made between people with at least 20 amalgam filled surfaces and those with four or fewer filled surfaces. The group with 20 or more amalgam filled surfaces were less likely to have had a heart attack, stroke or diabetes and did not show an increased risk of joint diseases, urogenital diseases or migraines when compared to those with four or fewer filled surfaces.

REFERENCES:

- 1) Meurman, J.H., Porko, C. and Murtomaa, H. Patients complaining about amalgam-related symptoms suffer more often from illness and chronic craniofacial pain than other controls. *Scand J Dent Res* 98(2):167-172, 1990.
- 2) Corbin, S.B. and Kohn, W.G. The benefits and risks of dental amalgam: current findings reviewed. *JADA* 125:381-399, 1994.
- 3) Jones, D.W. The enigma of amalgam. *J Can Dent Assoc* 59(2):155-166, 1993.
- 4) Ahlquist, M., Bengtsson, C. and Lapidus, L. Number of amalgam fillings in relation to cardiovascular disease, cancer, and early death in Swedish women. *Community Dent Oral Epidemiol* 21:40-44, 1993.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 11

A patient has had a bone impacted mandibular third molar tooth removed. Since this patient will require postoperative control of pain, which of the following, when given orally, will provide the best analgesia?

- A. Acetaminophen (Tylenol) 1000 mg.
- B. Ibuprofen (Motrin) 400 mg.
- C. Acetylsalicylic acid 325 mg and codeine 30 mg.
- D. Acetaminophen 300 mg and codeine 30 mg (Empracet 30).

QUESTION 12

Examination of a 70-year-old patient with a full complement of teeth reveals periodontal pocketing of 3 to 5 mm, areas of loss of attachment and supra-gingival plaque throughout. Which of the following is NOT contributory to this condition?

- A. Age.
- B. Chronic gingivitis.
- C. Chronic periodontitis.
- D. Plaque.
- E. None of the above.

QUESTION 13

Which of the following influence the polymerization of photocured composite resin restorations?

1. Size of the curing tip.
2. Light intensity.
3. Thickness of the composite resin.
4. Color of the composite resin.
5. Time of exposure to the light.

- A. (1) (2) (5)
- B. (2) (3) (5)
- C. (2) (3) (4) (5)
- D. (2) and (5)
- E. All of the above.

QUESTION 14

A 14-year-old girl with an excellent dentition and no abnormal medical history presents with an avulsed maxillary central incisor as a result of a blow which occurred one hour ago. You would consider immediate replantation after having performed which of the following?

1. Debridement of the root surface to remove any remaining soft tissue.
2. Rinsing of the root with saline.
3. Amputation of the root apex.
4. Aspiration and light irrigation of the socket with saline.
5. Curettage of the socket.

- A. (1) and (5)
- B. (1) and (4)
- C. (2) and (4)
- D. (2) (3) (4)
- E. All of the above.

QUESTION 15

After replantation of the tooth in question 14, you would

- A. extirpate the pulp immediately and fill the canal with gutta percha.
- B. remove the pulp after 48 hours and medicate the canal with calcium hydroxide.
- C. remove the pulp in 7 to 14 days and medicate the canal with calcium hydroxide.
- D. remove the pulp in 7 to 14 days and fill the canal with gutta percha.

(Answers to questions 11 to 15 will appear in next month's *Journal*.)

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Bisco, Colgate, the Fowler-Pearce Partnership (ScotiaMcLeod), Nobel Biocare, and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education credits required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education credits.

Funding for the SLSA program has been provided by:



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No. 11

CALGARY IN 1997

The Canadian Dental Association Convention will run from **Thursday, August 14 through Sunday, August 17**, a change from the usual Saturday to Tuesday Convention. **The Exhibits will be open on Friday, August 15 and Saturday, August 16.**

All the elements that have come to be a part of CDA Conventions will be offered in Calgary. At this time, we are developing a comprehensive Scientific Program and making preparations for the Dental Trade Exhibit.

In addition, we are planning Visits and Tours to various attractions in and around Calgary, a fun Children's Program, an enjoyable Social Program and a Golf Tournament (scheduled for August 13).

Two new programs that were introduced to the Convention in 1996 were very well received and will therefore be offered again. A Young Dentist Program and Keynote Presentations will be integrated into the 1997 program. More details will follow in the coming months.

A Convention Preliminary Program will be mailed to every Canadian dentist in March 1997.

Plan now to attend the national Convention for Canadian dental professionals.



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CDA Convention Dates for 1997
AUGUST 14 - 17



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Research Articles:

Are contributions dealing with research, diagnosis and treatment of dental disease, studies in education, clinical and laboratory research, and other detailed investigations pertinent to dentistry and related fields. The text should not exceed 2,500 to 3,000 words.

Clinical Reports:

Are brief (up to 2,000 words) reports, case histories and clinical observations. References should be limited, and a minimum number of illustrations used.

Opinions:

That are fully documented (800 words or less) will be reviewed for publication at the discretion of the Editor.

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1. Hechter, F.J. Symmetry and dental arch form of orthodontically treated patients. *JCDA* 44:173-184, 1978.

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2. Kilpatrick, H.C. *Works simplification in dentistry*, ed. 2, Philadelphia: Saunders, 1964.

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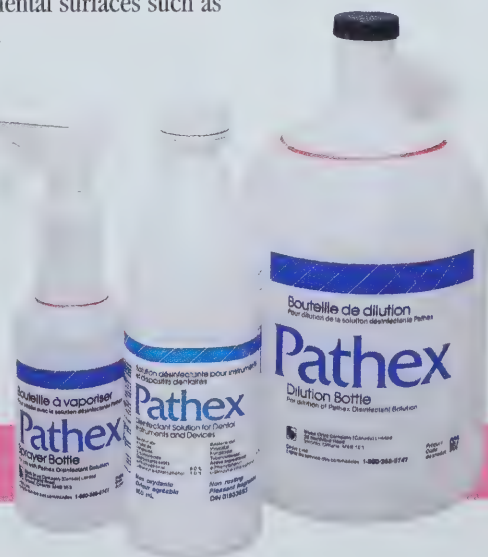
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References:

- 1 Data on file.
- 2 Block, Seymour S. Disinfection, Sterilization and Preservation. Fourth Edition, 1991.
- 3,4 ADA Council on Dental Therapeutics. Acceptance of (Synthetic Phenol) disinfectant for instruments and equipment. JADA 110:394, 1985.



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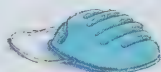


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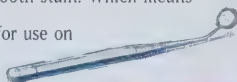
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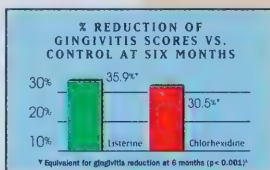
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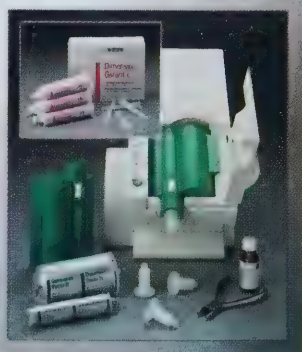


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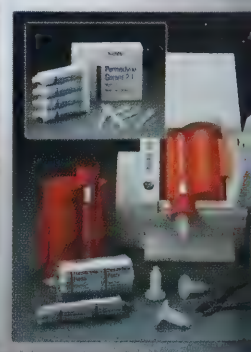
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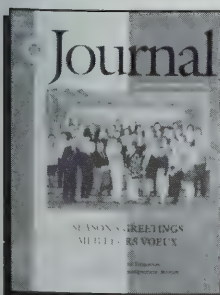
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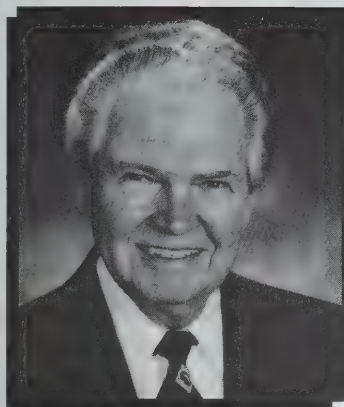
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EDITORIAL FEATURE

ARE WE READY FOR THE ORAL PHYSICIAN?



Dr. P. Ralph Crawford,
editor

Last May, I was fortunate to be one of the many invited guests to a symposium, Dental Education for the 21st Century, held at the University of Alberta. It marked a historic event in the annals of dental education in Canada, and, for that matter, in most of the world.

The event was really more than a symposium. It was a celebration of the opening of the university's new faculty of medicine and oral health sciences. Three renowned speakers led off the day, which ended with a black tie evening banquet.

A great deal was said about dental education, now and for the future, during this historic occasion. Many of the discussions that occurred were similar to those found in the excellent review, "Trends in Dental Education," by Drs. Ian Bennett and Marcia Boyd, on page 931 of this issue of the *Journal*, and in the opinion piece, "Evidence Based Dentistry," by Dr. J. A. Hargreaves, which appears on page 970. But two terms that particularly caught my attention, both during the symposium and in the subsequent hallway and meal-time conversations, were "integration" and "the oral physician."

The decision to integrate the faculty of dentistry with the faculty of medicine at the University of Alberta was one largely forced on dentistry. In a province where the government's mandate was to slash and burn its way to a balanced budget, the decision was between a negotiated integration or a closure.

An important element in the decision to maintain dental training in Alberta was the belief that the integration of the two faculties would cut approximately \$2.4 million per year from the university's budget. Other dental faculties and colleges throughout North America, many of which have struggled through years of budget restraint and cut-backs, will no doubt be closely observing the results of Alberta's initiative.

In the final analysis, however, the question, will the graduates of tomorrow be oral physicians?, may ultimately prove more important.

Three outstanding dental education experts addressed the May symposium — Sir David Mason, former dean of dental education at the University of Glasgow, Dr. Edwin Yen, dean of the faculty of dentistry at the University of British Columbia, and Dr. David Nash, dean of the college of dentistry, University of Kentucky. Each brought an individual perspective on the past, present and future of dental education. Throughout their presentations, integration and a different type of oral health graduate were common themes.

Sir David Mason addressed the question of why dentistry separated from medicine in the first place. Dental decay did not increase, he said, until the start of the 19th century when the importation of sugar from the West Indies began. All of a sudden, it was no longer just rich people who could have caries — dental disease affected everyone. Dental management had to expand to deal with the exponential increase in caries, and dentists began to be trained separately from physicians. In fact,

Sir John Tomes, who was instrumental in the establishment of the British Dental Association in 1878, advocated a separate education for dentists as early as the 1850s, saying, "utility alone is the reason for dentists' existence."

Sir David raised the question of whether, a century and a half after Tomes, we should reconsider how useful dentists are in relation to the needs of the population. "The World Health Organization in 1978," he said, "reaffirmed that we need to treat the whole population. Health care professionals must be concerned with all aspects of their patients' health. The dental profession can be very proud of what it has achieved in research and in the prevention of dental disease, but we still seem to practise more in isolation than is good for us in this changing world. Although the dental team concept has broadened our practice to include not just the teeth, but the oral region as a whole, there is still a lack of contact between dentists and others involved in health care."

In remarking that the new faculty of medicine and oral health sciences at the University of Alberta could not have come at a better time, Sir David warned that the changes occurring in dental education must be accompanied by a proper research base that evaluates the educational success of integration.

Dr. Edwin Yen traced some of the early roots of dental education in Canada, and then referred to the ramifications of current dental economics. He used both of these factors to explain why our teaching institutions are struggling to come to grips with the innovations required to meet today's challenges.

What Dr. Yen did not say, but can be inferred from his remarks, is that when five new Canadian dental schools were established between 1958 and 1971, it doubled the number of Canadian dental graduates. At the same time, dental caries were halved through the influences of fluoride and enhanced prevention. This phenomena,

which has been compounded by the downturn in global economics, has led to the near closure of the dental faculties at McGill University, and at the universities of Saskatchewan and Alberta. It is also behind the current discussion paper on the options for academic restructuring at the University of Western Ontario.

Dr. Yen spoke of the numerous challenges that dental colleges face today when they attempt to balance their missions between provincial cost-cutting agendas, and the importance of producing competent graduates. He included, among other factors, tuition fee increases, international student tuition, student debt, excellence in research, responsibilities to the community, and integration of curriculum in his discussion.

In addition, Dr. Yen outlined UBC's own particular blend of integration. For a number of years, the faculties of dentistry and medicine have integrated the entire basic science curriculum into what is referred to as a problem-based or case-based learning method. "Small groups of six or eight students use cases to discover the information they need," said Dr. Yen, "And these groups are made up of MD and DMD students working together as partners. The important thing to realize is that we are not trying to produce mini biochemists, mini microbiologists or mini whatever. We are producing clinicians. Integration is now a base of learning. The clinical program will probably become much more patient-centred, team-oriented and evidence-based, and will probably search out special populations, those at high risk for dental disease."

Dr. David Nash made the strongest appeal for the integration of dental and medical faculties, and for the creation of a new professional — the oral physician. His own faculty in Kentucky will introduce a form of oral physician in 1997. "To my knowledge, you are the first university in North America to acknowledge that it does not make sense to maintain a separate faculty for teeth. Alberta, you have

become a model for North America — a model I predict will become the norm. I think this truly will become a historic day in dental education."

Dr. Nash agreed with Sir David Mason about the reasons for the current autonomy of the dental profession. The separation of medicine and dentistry in the United States was also the result of the overwhelming prevalence of oral disease associated with the growth of the sugar industry during the mid 19th century.

However, Dr. Nash reported that when Dr. William J. Gies submitted his report on dental education in 1926 — the report that eventually established dental education as we know it today — the separation of dentistry and medicine was not necessarily Dr. Gies' first choice. Although Dr. Gies' primary basic conceptual view was that dentistry should be integrated with medicine as an oral health specialty, according to Dr. Nash, he felt that if dentistry did not wish to become an oral health specialty linked to medicine, then public interest would ultimately define the creation of a full health service equivalent.

Further, said Nash, the recent report of the Institute of Medicine (IOM) Division of the National Academy of Sciences, *Dental Education at the Crossroads*, supports Dr. Gies' views of 70 years ago. The IOM report panel developed 22 recommendations that touched on the total mix of dentistry: education, licensure, long-term availability of funds to keep dental schools in the business of education, different delivery systems and the integration of dentistry with medicine. The report underscores the point that dentists need to become comprehensive care coordinators, which will demand a greater knowledge of medical problems, and a refinement of clinical acumen and diagnostic skills.

Dr. Nash emphasized his views by stating, "There is no reason to believe that the first 20 centimetres of the alimentary canal should be treated conceptually differently than any other part of the human

body. Dentistry is to medicine as ophthalmology is to medicine — they are equivalent specialties of medicine. The scientific knowledge base required of dentistry to manage the oral health of individuals resembles that required by a specialized physician managing the health of any other body organ system. Dentistry must be fully integrated into our health care delivery system if oral health is going to receive its justified and equitable share of concern and financing — both for and from the public."

In explaining some of the elements of the new curriculum planned for July 1997 at the University of Kentucky, Dr. Nash said, "We are calling for a five calendar-year curriculum for dentistry, with the first three years dedicated to a core curriculum of medicine and the final two years devoted exclusively to teaching the art and science of dentistry. In five years, we will award an MD or DMD degree to create a new oral health professional in the new century — an oral physician ... uniquely qualified to provide oral health care to a growing population whose management is more complex because they are medically and pharmacologically compromised."

No one can deny that these are changing times in our country, or in the world. The demands of economics, the change in the patterns of dental disease, and the shifts in demographics are already influencing the education of dental students and the future role of dentists. Nor does it appear that there is a crystal ball clear enough to steer the profession in an exact direction. The experience of amalgamating medicine and dentistry in Alberta, and the introduction of the new oral health care professional in Kentucky, are only indicative that these are indeed changing times, and that we haven't heard the last of "integration" or of "the oral physician" — whether we are ready for them or not.

*P. Ralph Crawford, BA, DMD
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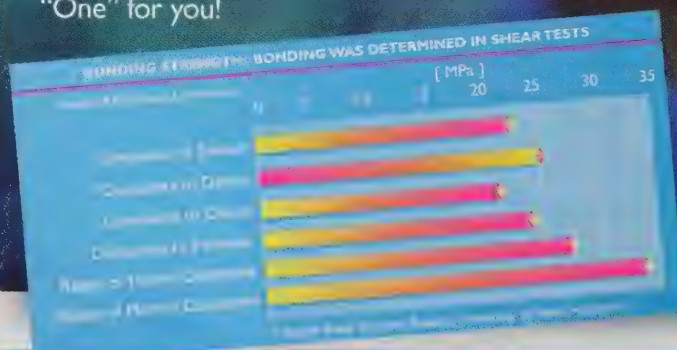
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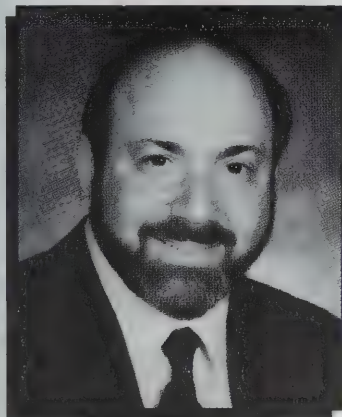
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PRESIDENT'S COLUMN

BUILDING A NEW CDA



Dr. Barry Dolman,
CDA president

If you ever wonder how you managed to struggle through multiple final exams in your undergraduate days, or how you regularly manage to see your normal patients, in addition to squeezing in two emergencies, who invariably walk through the door together today, or even how you can always find the money to fix a broken VCR, when you couldn't scrape together enough cash to donate to a worthy cause the week before, you're not alone.

What we are really talking about, of course, is focus and priority. If you really want to do something, and you really focus on it, you'll generally succeed. But you can't be in sharp focus and prioritize without proper structure or support.

You have all witnessed CDA's many achievements during the past two years. What you don't realize is that — despite all outward appearances — we are operating in a crisis mode. CDA's ability to react quickly and effectively to the new, aggressive challenges facing our profession is in jeopardy.

Ten years ago, we might have responded to the problem by cutting programs, and freeing up the resources we needed to get the job done. Five years ago, we may have tried to do more with less. But these choices aren't realistic in today's fast-paced world.

So we are left with a dilemma and some questions. Should CDA engage the managed care issue? Should we make our way onto the information highway, and prepare for informatics? And, if the answer is yes, will the support be there to pay for these initiatives?

I remember a colleague of mine who was having some financial problems. When he told me that he could not afford to switch to sterilizable handpieces, I told him that he couldn't afford not to.

CDA is in a similar position. Somehow, somehow, we have to find a way to take on the challenges facing our profession, regardless of the cost.

We took the first step toward this objective in August, when CDA's board was presented with a scenario to increase staff in certain key areas. The intent of CDA's restructuring plan is to ensure that the cracks that appeared in our organization over the last two years, as it stretched to respond to each new crisis, can and will be closed.

But we must close these cracks in a way that leaves CDA's financial house in order, which is why CDA's management committee has made a commitment to balance the 1997 budget.

CDA's ability to protect the profession, and promote the optimal oral health of Canadians, is what's at stake. If we're going to win the day, and rebuild CDA for the future, funding support will be required.

If CDA could secure the support of every dentist in the country, or was fully supported by our corporate members, there is no doubt that membership fees could be reduced without having any impact on our ability to move forward with restructuring. Unfortunately, the reality that CDA and nearly every other non-profit organization faces is that the committed end up supporting the freeloaders. In effect, the CDA members who pay for our government relations and issues management activities are supporting the nonmembers who don't.

One colleague of mine says he can't afford CDA, even though he belongs to an exclusive golf club. Another, a specialist who could find the cost of membership in the pro-

ceeds from one procedure, admits that he would have no problem doing so if it was obligatory to join CDA. Another plans to drop his membership because CDSPI denied his insurance claim. Yet all three of these dentists eagerly reap the benefits that CDA achieves on behalf of the profession.

My friends, we are quickly reaching a crossroads. CDA must expand, even if it's slowly and in a measured fashion. And we must do so in a way that allows us to embrace the grassroots dentists we represent. We must move boldly into 1997, propelled by the support of dentists from coast to coast, and their commitment to support CDA.

Last month, at our planning session, we engaged in a candid discussion of how we could improve our ability to represent the entire profession of dentistry. It quickly became evident that CDA must find a way to give licensing bodies more representation, and to build a strong connection, based on free and open discussion, rather than a political agenda, with the provincial CEOs and presidents.

Although our immediate goal is to convert the unconverted, and gain more support for CDA, we clearly cannot postpone taking leadership of the key national issues challenging our profession.

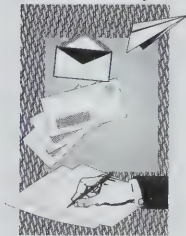
But CDA can only succeed if we give it the tools. If CDA fails to achieve everything it has set its sights on, its failure will be ours, collectively. If it succeeds, its success will be our success.

Membership has its rewards, but it isn't a free ride. Unless you are committed to support CDA in 1997, and connect to its reality check, don't complain if you aren't informed that allied dental personnel view managed care as their salvation; don't complain when your patients stop returning for recall appointments because their dental plans are more restrictive; and don't ask what organized dentistry is doing for you.

On behalf of CDA and my family, have a safe, happy holiday season, and a healthy New Year. ■

Barry Dolman, DMD
President of the Canadian Dental Association

LETTERS



Safety of Dental Materials

The latest Health Canada position statement on amalgam (August 20, 1996) should be an opportunity for the dental profession to turn the page on the amalgam issue. Although the Canadian Dental Association (CDA) has again chosen to emphasize the safety of amalgam, dentists and the general public should remember that CDA claimed for decades that mercury was "captive" in amalgam, only to be proven wrong when the scientific evidence showed, beyond a shadow of a doubt, that mercury vapors are continually released from amalgam. The fact is, there is a growing body of scientific evidence pointing in one direction: amalgam is not as safe as CDA would like us to believe. My colleagues who take the time to read the actual research instead of relying on opinion papers generally published in dental journals will be able to draw their own conclusions.

The biological safety of dental materials is an issue that needs to be seriously looked at because it is not limited to amalgam. Other metals, such as nickel, are still frequently used in dentistry even though there is ample scientific evidence of its toxicity. Dissimilar metals are also frequently used along with amalgam even though it is known that saliva is an excellent electrolyte and will induce galvanism in the presence of dissimilar metals. In fact, a wide range of materials are used without proper research on biological compatibility. As a dental practitioner, I have found it difficult to obtain this information from dental manufacturers. Most of the emphasis is usually placed on physical properties.

As health professionals, we should remember that each one of our patients is unique and should be treated as such. Because we are frequently implanting materials that will remain in their bodies for years, these materials should be tested for individual bio-compatibility. We should also remember that reactions to dental materials are not limited to allergic reactions, and that continual exposure to minute amounts of toxic substances can lead to chronic accumulation in body tissues. This situation is not only conducive to chronic toxicity, but also to immune reactions. Swedish immunologists have developed a test, the MELISSA test, to assess an individual's immune sensitivity to different metals.

This information, along with research on the biological effects of dental materials, should be published in dental journals such as the *Journal of the Canadian Dental Association* and *Journal Dentaire du Québec*. I am sure that my dental colleagues can come to their own conclusions. After all, they are providing the treatments and are ultimately responsible for the selection of dental materials. When there is a known risk, it should be shared with the patient who should then make the final decision.

Jacques Imbeau, DMD
Tauranga, New Zealand

Managed Care

While attending the recent FDI/ADA meeting in Orlando, Florida, I could not help but notice that the topic of conversation in the hallways of the convention centre among the thousands of attending dentists was managed care. It is an issue facing all concerned dentists — south of the border and here at home in Canada.

We are certainly aware that Canadian employers are having to make tough decisions in order to keep their dental benefit costs under control, and we are also aware of the impact of the busyness problem — too many dentists for the supply of patients. My personal feeling, from conversations with my dental confreres, is that we do not want to become employees of managed care companies. We want to maintain our role as independent

dental professionals. And we grassroots members expect a strong fight against managed care by our associations' elected officials.

Perhaps the problem can be attacked at three different levels. First, CDA and the provincial associations should stop studying manpower requirements to death. They should acknowledge the oversupply problem. Downsizing or closing of our own Canadian dental schools while still allowing in dentists from the United States or abroad is not a good answer. I realize any efforts in this area run afoul of reciprocity and free trade, but every effort should be extended to alleviate the problem.

Second, our associations must mount an extremely strong campaign to meet with employers to explain the pros and cons of managed care for their employees. This can work effectively at the grassroots level if representatives from provincial dental societies visit employers in their area to give the dentists' point of view on managed care.

Third, as Dr. Howard Farran is trumpeting in the United States, dental companies target their advertising dollars at dentists in an effort to sell their products. If only a fraction of these advertising dollars were redirected to promoting their products to the population at large, dentists might see a significant increase in the demand for their services. A simple example is sealants. Companies making sealant products would be much better off spending advertising dollars to tell the public the benefit of sealants, rather than bombarding the dental profession.

Our associations must be much stronger and much more aggressive in their response to the aggressive campaigns mounted by managed care companies. The "Say No" campaign that was so effective against capitation a number of years ago was a good start, but the next volley has been fired by managed care companies. Dentists and the public should watch out.

Kerry G. Ley, DDS
Guelph, Ontario

Access to Oral Health Services

Despite all the recent advances in modern dentistry, there is still not adequate access to oral health services for all Canadians. I am writing to comment on the following passage in the CDA president's inaugural column (*J Can Dent Assoc* 62:761, 1996): "Do they understand what they will be giving away if they discard the fee-for-service model of dental care that has served our patients and our profession so well for so long?" I cannot deny that this model of reimbursement may have served the profession so well for so long, but I do have doubts regarding the claim that it has served our patients so well for so long.

If we deconstruct the term 'fee-for-service' we can see that it translates to: you pay a fee and you receive a service. Therefore, it stands to reason that you do not receive a service if you do not pay the fee. Three recent studies researching barriers to access to dental services for low-income and marginalized populations found that the leading barrier to dental services was financial.¹⁻³ A study of

the health status and barriers to health care of 458 homeless women and men in Toronto¹ found that almost one quarter of respondents had not visited a dentist in more than five years (compared to eight per cent for the general population in Toronto), and that 34 per cent indicated that financial barriers were the primary reason for this situation. There were 155 people who were not able to pay the requisite fee for dental treatment and who therefore could not purchase dental services.

While the dental profession is only beginning to debate the relative merits of different models of care (fee-for-service, salaried and managed care), the medical profession has become increasingly focused on the impact of the fee-for-service model on both health care costs and the quality of care. The Ontario minister of health, Mr. Jim Wilson, stated in an article in *The Globe and Mail* that "the current fee-for-service approach has not promoted an efficient health-care system because it gives doctors a strong financial incentive to boost their incomes by seeing large numbers of patients."⁴ At present, fee-for-service

approaches to publicly-funded dental programs are being re-examined by government officials at various levels in an attempt to increase their cost-efficiency. Perhaps it's time for the dental profession to look for an oral health care model that is both suitable to the profession and able to overcome barriers to access to dental services that exist within the fee-for-service model. While managed care may not be a panacea, fee-for-service is certainly not sacrosanct.

Joel Rosenbloom, DDS
Toronto, Ontario

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No. 12

NEWS UPDATE

CDA Reviews Mission Statement, Goals

Following careful review, CDA will maintain its current mission statement and goals for at least one more year.

The mission statement and goals were reviewed by members of the association's executive council November 6-10, during its annual fall planning session.

At the end of the session, executive council agreed that both the CDA mission and goals accurately reflect what the association is doing and wants to be doing on behalf of the dental profession.

"We looked at CDA's *raison d'être*, and what we are all about, and we determined that the mission statement and goals that were adopted five years ago are still valid," said CDA president Dr. Barry Dolman.

"It was also an opportunity to look more closely at CDA's teamwork initiative. The idea is to link our mission and goals to those of our provincial corporate members. By avoiding overlaps and duplication in what we do on behalf of the profession, we will ensure that dentistry makes the most efficient use of its resources. Equally important, we can work toward a harmonized membership approach to avoid the current competition for individual members in the voluntary provinces, and provide improved services in the provinces where dentists join CDA on a voluntary group basis."

Executive council also discussed the feasibility of giving provincial dental association presidents and chief staff officers more opportunity to participate in CDA's governance. The intent would be to make CDA more effective, and gain greater provincial support for its decisions and policy setting initiatives.

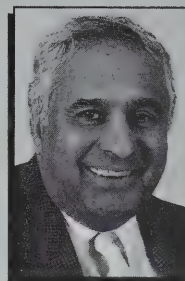
"We want our corporate members to feel a greater sense of ownership for their national association, so that they feel connected to the various activities that CDA undertakes on behalf of the profession," said Dr. Dolman. "It's really about creating an effective division of la-

Past-President of Nova Scotia Dental Association Dies Suddenly

Dr. Terrence (Terry) Ingham died suddenly at his home in Halifax, October 20, 1996.

Born in Bermuda in 1936, Dr. Ingham received his early education in Bermuda and New Brunswick. He graduated with a B.Sc. from the University of New Brunswick in 1958, and received his DDS from Dalhousie University in 1962.

Following graduation, Dr. Ingham established a private practice in Halifax, and became a part-time member of the faculty of dentistry at Dalhousie University. Actively involved in organized dentistry, he was a past-president of the Halifax County Dental Society and the Nova Scotia Dental Association. Dr. Ingham was a fellow of both the International College and the American College of Dentists. ■



Dr. Terrence Ingham,
1936-1996

bor at the national and provincial levels, and working together in a unified fashion to meet the challenges facing our profession."

A paper outlining ways and means of achieving connectiveness between CDA and its corporate members will be presented to executive council for discussion in January. ■

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Other good news about Ontario and Quebec will be announced soon. Stay tuned! ■

The Order of Canada

In listing the names of dentists who have been named to the Order of Canada since its creation in 1967 (*J Can Dent Assoc* 62:780, 1996) the name of Dr. Conrad Godin of Trois-Rivières was inadvertently omitted. Dr. Godin received the Order of Canada in December 1978.

With an outstanding and distinguished career in dental and community circles since his graduation from the University of Montreal in 1933, Dr. Godin was also awarded Honorary Membership in the Canadian Dental Association in 1984. ■

Paul Anka Isn't Smiling

Paul Anka isn't smiling over some recent dental work he received.

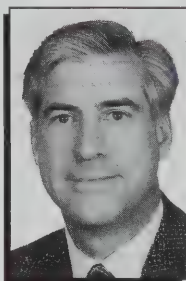
Mr. Anka filed a malpractice lawsuit against his dentist, Dr. Frederick Glassman, after his crown came loose and flew into the audience during a show June 20 in Las Vegas.

The lawsuit claims it was the third time the crown had loosened or dislodged since the crooner got it in 1994. Mr. Anka, 55, said he tried to keep singing even with the gaping hole in his teeth, but had to end the show after only one song. The crowd of 1,000 received refunds from the hotel-casino, according to the lawsuit. ■

Dr. Douglas Vincelli — CAOMS President

Dr. Douglas J. Vincelli, a private practitioner from Calgary, Alberta was installed as president of the Canadian Association of Oral & Maxillofacial Surgeons (CAOMS) during its annual meeting held in Cairns, Australia, September 12-16, 1996.

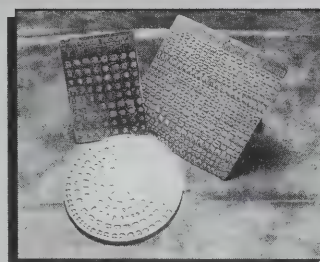
Dr. Vincelli is a 1978 dental graduate of McGill University and received his graduate training in OMS from the same institution. He



Dr. Douglas J. Vincelli

WHAT'S IT

Over the past few years, the CDA Dental Museum has collected variations of die-plates. They have survived mainly because, being made of sturdy metal, they are virtually indestructible. However, most of us dentists who graduated in the last 40 years have no idea what they are and how they were used.



We appeal to any informed reader to provide us with a detailed description of how die-plates undoubtedly played an important role in the dental office and laboratory. Please write to Dr. P. Ralph Crawford, Editor, Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6. ■

is a fellow of the Royal College of Dentists of Canada and a diplomate

of the American Board of Oral and Maxillofacial Surgeons. ■

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Common Stock	15.7%	26.6%	5.6%	10.1%	9.9%	12.0%	8.6%	8.9%
Balanced	✓ 19.8%	18.7%	✓ 9.1%	8.9%	10.4%	10.6%	✓ 9.3%	8.7%
Bond & Mortgage	✓ 14.6%	12.8%	✓ 8.4%	7.5%	✓ 10.2%	9.4%	✓ 10.3%	9.8%
Money Market	✓ 5.5%	4.5%	✓ 5.5%	4.9%	✓ 5.6%	5.2%	✓ 7.9%	7.6%
International Equity	6.5%	13.0%	n/a		n/a		n/a	
European	16.2%	17.9%	n/a		n/a		n/a	
Pacific Basin	2.6%	2.0%	n/a		n/a		n/a	
Emerging Markets	-0.7%	13.1%	n/a		n/a		n/a	

[†] CDA figures indicate annual compound rate of return with all fees deducted. The figures are historic rates based on past performance and are not necessarily indicative of future performance.

* Comparison performance figures are Globe and Mail averages for the range of similar funds offered in the marketplace before sales charges, as published in the November 21, 1996 issue.

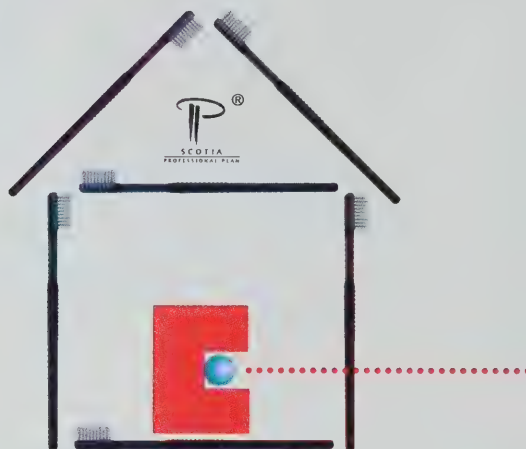
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BOOK REVIEWS

The Metabolism and Toxicity of Fluoride, 2nd revised edition

by Gary M. Whitford

1996, *Monographs in Oral Science*, No. 16, Karger: Basel; \$172.25 (US); 156 pages, black and white illustrations
ISBN: 3-8055-6247-0

This book is aimed at dental students, dental academics, toxicologists, pharmacologists and physiologists. It also has advantages for practising dentists and hygienists, most of whom, when they apply topical fluoride gels to the teeth of young patients, do not realize how close to the toxic level of fluoride (about 5.0 mg F/kg body weight) these patients would be if they swallowed the gel.

Readers may feel that they are looking at the author's laboratory notebooks, in that much of the text describes his own research and the experimental evidence for his views. This information is nevertheless worthwhile, as Dr. Whitford has undoubtedly made major contributions to our understanding of fluoride metabolism and toxicity, and is probably the leading authority on these topics.

In particular, Dr. Whitford's work has emphasized the role played by hydrofluoric acid (HF), with which F^- is in equilibrium. The proportion of HF increases as the pH is reduced, and it is the species which easily diffuses across both mammalian and bacterial cell membranes. This property of HF provides an explanation for the rapid absorption of fluoride from the stomach, the greater effect of fluoride on bacteria when the pH is low, and the benefits of urinary alkalization as part of the treatment for fluoride toxicity. Dr. Whitford's recent studies have shown that the fluorosis-like changes in the teeth of people living at high altitudes are not due to increased susceptibility to fluoride, but to the hypobaric hypoxia caused by the reduced atmospheric pressure.

Although Dr. Whitford is both a dentist and a physiologist, the main emphasis of this book is on fluoride physiology rather than on its dental effects. For instance, there is very little information provided about enamel fluorosis, and only five pages are devoted to fluoride and dental caries. Other topics covered include fluoride analysis, a comparison of the effects of sodium fluoride and monofluorophosphate, factors influencing fluoride absorption and its distribution within the body, the renal handling of fluoride, factors modifying fluoride metabolism, and its acute and chronic toxic effects. Dental students would probably have appreciated a summary paragraph at the end of each chapter.

Since fluoride is a key factor in preventive dentistry, this well-written book will be a valuable source of information for those who wish to learn more about its metabolism and potentially toxic effects.

Reviewed by:

Colin Dawes, B.Sc., BDS, PhD
Professor of oral biology, University of Manitoba

Critical Thinking — Understanding and Evaluating Dental Research

by Donald Maxwell Brunette

1996, *Quintessence*: Chicago; \$38 (Cdn); 244 pages
ISBN: 0-86715-301-6

This is not just another book on statistics. It is written especially for oral health students, practising dentists, allied health professionals and dental researchers — i.e. all who are responsible for interpreting the growing mountain of dental literature. Provincial licensing authorities and the National Dental Examining Board require that dentists be able to "locate, understand and critically evaluate" dental literature. Unless they graduated from Harvard, most oral health

professionals learned very little about interpreting dental literature at the undergraduate level. Specialists, on the other hand, are expected to be more knowledgeable about their fields and are likely able to interpret dental literature with a certain amount of sophistication already.

This is the first book on statistics that I actually enjoyed reading. It is written in a style that explains everything clearly. Dr. Brunette chooses common dental practice situations to illustrate some of the many complex statistical concepts. He also uses humor in several places, and I actually caught myself laughing out loud a few times.

The book begins with chapters on the scientific method, logic, hypothesis testing and determining causation. These are followed by a great chapter on how to identify quacks in dentistry. Dr. Brunette then gets into the real number-crunching statistics on topics such as measurement errors, presenting results, reliability and validity. The reader is then guided through chapters on how to properly design clinical studies and how to correctly interpret their results.

For those of you who have always been intimidated by the so-called experts in dentistry, Dr. Brunette's text is essential reading. This book will give you the tools you'll need to converse intelligently about whether the hottest new technique or product really is as good as the 'experts' claim it is. It may help you become an expert yourself.

Being able to dissect and criticize claims made for new products or new techniques will empower you, but it will also make you cynical. After reading Dr. Brunette's book you will start to question every clinical study ever performed. And you'll start to question why you do what you do every day. Be warned. You may wonder about the validity of some of the clinical services you provide and you'll think about changing your habits. For example, when you discover that there is no solid evidence that

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No. 12

cleaning teeth prior to a fluoride treatment provides any better protection against caries, you may have a hard time telling some of your young patients that they don't need a cleaning.

While there are relatively few procedures performed each day in the dental office that have not been tested thoroughly in experiments, some procedures in dentistry seem so intuitive, such as extracting painfully abscessed teeth, that they have become standard practice. Dentistry is now so sophisticated that complicated statistics have been devised to 'prove' that some procedures work and others don't. I went through a period in my clinical career when I was sceptical about statistics. But, it didn't take me long to realize that clinical proof is essential in our profession, and proof is only truly proof when the numbers back it up.

Many important discoveries have been made by very observant and skilled clinicians because they took full advantage of their many years of clinical experience. Imagine the potential of our profession if every dentist was able to critically evaluate the dental science literature the way some dental academics do! This book will become an essential resource for every dental researcher and I believe it should also be part of every private practitioner's collection.

Reviewed by:

Hardy Limeback, B.Sc., PhD, DDS
Associate professor and head, preventive department, faculty of dentistry, University of Toronto

Clinical Periodontology, 8th edition

by Fermin A. Carranza and Michael G. Newman

1996, W.B. Saunders Company:
Philadelphia; \$113 (Cdn); 782
pages, some color illustrations
ISBN: 0-7216-6728-7

This text is written for dental students and practitioners of general dentistry. The eighth edition incorporates all the major advances that have taken place in periodontics.

Clinical Periodontology is organized into five major divisions: the normal periodontium, classification and epidemiology of periodontal disease, etiology of periodontal disease, periodontal pathology, and the treatment of periodontal disease (this last section comprises nearly 50 per cent of the text). The order of the subjects is logical as it follows the series of steps taken in treating any periodontal patient — examination, diagnosis, treatment, and periodontal supportive (maintenance) therapy.

Each section is well organized. Subject material is readily located in the text, and the written content is well-supported with black and white and/or color illustrations. The areas which have been revised the most since the previous edition include advanced diagnostic techniques, implantology and peri-implant disease. One of the best presented subjects is a comprehensive review of the etiology of periodontal disease, including all the

local factors (plaque, calculus, root anatomy, iatrogenesis), dental occlusion, and the influence of systemic disease (diabetes, immunodeficiency disorders and HIV). Other strengths of this text include a well-presented review of the different bone loss patterns, an easily understood chapter on prognosis, a complete review of periodontal instrumentation, and a concise presentation on the role of antibiotics in periodontics.

Overall, this is a well-organized and comprehensive text on periodontics, and it should prove to be a suitable reference for both students and general practitioners of dentistry. It answers many of the questions most often asked by practising clinicians during the treatment of patients with periodontal disease, and it is therefore a good addition to the library of any dental practice.

Reviewed by:

Paul Jackson, DDS, M.Sc., FRCD(C)
London, Ontario

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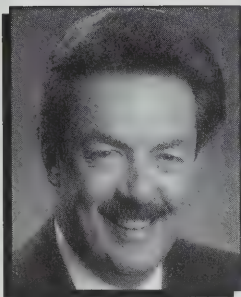
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CANADIAN DENTAL SERVICE PLANS INC.

DENTAL BENEFITS ISSUES



Introducing the PMSS

James Gagnon

In July, when CDA created a new Department of Practice Management Support Services, or PMSS as we like to call it, our initial focus was on managed dental care.

We wanted to become more proactive in the dental benefits area and, of course, to play a lead role in seeking solutions to the problems affecting Canada's oral health care delivery system. Our goal was to preserve access to optimal oral health for Canadians, as well as the dentist's ability to provide optimal care.

However, the responsibilities and goals of the PMSS department extend well beyond managed dental care. As the year quickly draws to a close, I would like to describe the department's role in more detail and discuss what it has done on your behalf over the past six months.

Clearly, public and private third-party dental plans are of great interest to every dentist in Canada. The PMSS department is maintaining close contact with the various partners involved in the delivery of oral health care in Canada, including the insurance industry, the government departments concerned, national employers such as the Treasury Board of Canada, Canada Post and CN Rail, unions and special-interest groups like the Canadian Federation of Independent Business, and, of course, Canadian dentists.

These actions are often undertaken in cooperation with other CDA departments and/or the provincial dental associations. Needless to say, we are keeping a very close eye on the managed dental care initiatives being proposed by the companies seeking to control plan costs by limiting patient access to benefits, and restricting the therapeutic freedom of participating dentists.

On behalf of CDA, I have attended several presentations on the managed dental care issue, and written articles about it for the *Journal*

and other publications. I will be taking part in more such meetings and workshops in the coming months. They provide an ideal opportunity to present dentistry's concerns about managed dental care to other stakeholders, and to keep abreast of the latest developments.

Communication between all the stakeholders will be essential as we move toward finding a cost control solution that meets the needs of all the partners, including dentists, patients and employers.

The PMSS department, as its name implies, also has a responsibility to assist you in your day-to-day practice. So far, this has involved publishing management-related articles, as well as providing guidelines on subjects such as the Goods and Services Tax (GST) and dentistry, the effect of taxes on the various types of practices, and so on.

To facilitate this process, and keep you fully informed, we meet periodically with Revenue Canada, the Department of Finance, and other government agencies, as needed.

We are also involved in the production of the USC&LS (Uniform System of Coding and List of Services), which CDA publishes annually in cooperation with the third party committee. This valuable publication ensures that the descriptions and codes used to identify the dental procedures performed by Canadian dentists are consistent across the country.

In addition, we are preparing a new seminar series on topics related to your day-to-day practice, including a seminar on Issues In Elderly Dental Care, which was piloted in Vancouver earlier this month. We are planning to offer one or more new seminars in 1997, to help you increase your patient base and manage your practice effectively in today's difficult economic climate.

Finally, the PMSS department is responsible for CDAnet, including

the day to day administration and the development of appropriate software. Our goal is to increase the number of dentists who use the system, and maintain the profession's key role in the electronic exchange of insurance data and claims processing information.

In addition to assisting the dentists who use CDAnet, we also offer support services to the insurance networks on the system, as well as to software suppliers. The high-tech CDAnet system has gained world class recognition, and it is expanding rapidly across Canada. We invite you to join CDAnet without delay, if you are not already enjoying its many benefits.

As you can see, the PMSS department is very proactive, and very much involved in subjects and activities of importance to your everyday practice. This will be even more evident in 1997, as we move ahead with several key initiatives, which include:

- defining acceptable alternatives for employers struggling with increases in the costs of providing dental plans;
- producing documents for dentists, patients and employers describing dental benefits, free choice and therapeutic freedom;
- attending work sessions with representatives of the insurance industry;
- increased contacts with Canadian dentists;
- increased participation by both insurers and dentists on CDAnet; and
- providing a seminar program on various topics related to different aspects of practice management.

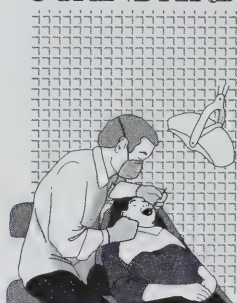
On behalf of the department staff, Pat, Karin, Monique and myself, allow me to wish you a very happy holiday season. ■

Mr. James Gagnon is CDA's director of practice management support services.

Journal

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NATIONAL STANDARD



Certification of Competence: A National Standard for Dentistry in Canada

Marcia A. Boyd, DDS, MA

Jack D. Gerrow, DDS, MS, M.Ed.

ABSTRACT

After consulting a large community of interested parties,^{1,2} the National Dental Examining Board of Canada (NDEB) and the provincial licensing authorities recently made significant changes to the certification process for dentists in Canada. This paper provides a chronology of the evolution of national certification and a summary of the present certification processes for graduates of both accredited and non-accredited programs.

SOMMAIRE

Après avoir consulté un grand nombre de groupes d'intérêt,^{1,2} le Bureau national d'examen dentaire du Canada (BNED) et les ordres provinciaux ont récemment apporté d'importants changements à la procédure de certification au Canada. Cet article offre un aperçu chronologique de l'évolution de cette procédure nationale et un résumé de celle qui est actuellement en vigueur tant pour les diplômés des programmes de formation agréés que pour ceux des programmes de formation non agréés.

The National Dental Examining Board of Canada

History

In 1906, under the auspices of the Canadian Dental Association (CDA), the Dominion Dental Council was formed to establish a national standard of competence and to conduct a national

written examination. Candidates who successfully completed the examination were granted a certificate. Most provincial dental licensing authorities were prepared to grant a licence to practise to those who had obtained the certificate. Some authorities, however, viewed the certificate as an academic measure only and therefore required an additional provincial practical test.

The Dominion Dental Council proved to be ineffective. In 1950, it became the Dental Council of Canada. Still, in spite of their agreement with the general concept of eliminating provincial licensing examinations and developing a more efficient examination process, certain provincial licensing authorities continued to require provincial examinations. In 1951, CDA encouraged the 10 provincial licensing authorities to meet in an effort to develop a satisfactory plan for a National Examining Board. The board would provide a mechanism by which members of the profession could become eligible, on a national basis, to apply for practice privileges in the province of their choice. This meeting resulted in the incorporation of the National Dental Examining Board (NDEB) of Canada in 1952 by an Act of the Parliament of Canada.³ The Act was supported by all 10 provincial licensing authorities and by CDA.

According to the Act, NDEB is responsible for: establishing qualifying conditions for a national

standard of competence for general dental practitioners; establishing and maintaining an examination facility to test for that national standard; and issuing certificates to dentists who meet the standard. A 1973 amendment to the Act included the establishment of qualifying conditions for a single standard national certificate for dental specialists, to be granted by NDEB in cooperation with, and contingent upon, the approval of the Royal College of Dentists of Canada.⁴

Since its inception, the NDEB certificate has been accepted by most provincial licensing authorities as evidence of having met the national standard. With the changes implemented in 1994, all provincial authorities now endorse the current NDEB certification process, which therefore provides true national portability.

Structure

NDEB is composed of 12 members: one from each of the provincial licensing authorities and two appointed by the Commission on Dental Accreditation of Canada (CDAC). In 1979, the board agreed to have a student observer, appointed by the CDA Committee on Student Affairs, attend its annual meeting. In 1994, a second student representative and representatives from CDAC, the Association of Canadian Faculties of Dentistry (ACFD) and the Royal College of Dentists of Canada

(RCDC) were designated as official observers. The board meets annually, and its six-member executive committee meets twice a year. NDEB also has standing committees for examinations, appeals, finances and by-laws.

Examiners appointed by the board develop and conduct the written and clinical examinations. The examiners for the written examinations are selected from a roster of potential examiners recommended by the deans of all Canadian faculties of dentistry, while clinical examiners are selected from a roster provided by the provincial licensing authorities. Chief examiners for each examination are appointed annually.

NDEB appoints two of its members to CDAC and one member to the CDA Council on Dental Education. The board also provides for, and financially supports, the participation of an appointee on all DDS and DMD accreditation site survey teams for Canadian faculties of dentistry. In addition, NDEB contributes a significant annual grant (\$36,000 in 1996) to CDAC toward the cost of the accreditation process.

The Certification Process

The NDEB certification process assesses whether a candidate has the necessary cognitive and clinical skills to competently practise dentistry in Canada. To make that assessment, certification examinations are designed to evaluate a candidate's didactic knowledge, clinical judgment and clinical skill.

Certification of Current Graduates of Dental Programs Accredited by CDAC

Before 1971, a graduate of a Canadian dental program was required to successfully complete a written examination in order to be certified. In 1971, however, NDEB decided to recognize the examinations and evaluation undertaken in the undergraduate programs of Canadian faculties of dentistry that were validated through accreditation. The board therefore began to issue certificates to graduates without further examination.

In 1989, as a result of the provincial licensing authorities expressing concern about the validity of determining competency through accreditation,⁵ NDEB established a committee "to explore whether the granting of a certificate on the basis of accreditation alone continues to be acceptable."⁶ This concern was intensified by CDAC's decision to extend the accreditation cycle from five to seven years. At the 1990 NDEB annual meeting, the board's certification review committee presented its report, which stated that certification based on accreditation alone was no longer acceptable. This finding was also supported in the *Parker Report*.⁷

Consequently, NDEB authorized two pilot projects to introduce and test the use of NDEB external examiners in the final evaluation of a random sample of senior-year dental students. This process is similar to one used in the United Kingdom. NDEB was satisfied with the outcome, and, in 1993, began to require a favorable evaluation by NDEB's external examiners for the certification of graduates of accredited Canadian faculties of dentistry.

As not every student was examined, this process failed to meet the requirements of the provincial licensing authorities. Therefore, in 1993 and 1994, at the request of the authorities, NDEB abandoned the external examiner system and developed and implemented an Objective Structured Clinical Examination (OSCE) as part of the certification process. Currently, to be certified, graduates of dental programs accredited by CDAC must successfully complete the written examination and the OSCE.

Certification of Graduates of Dental Programs Not Accredited by CDAC

Graduates of dental programs not accredited by CDAC must provide evidence of having graduated from a recognized or listed undergraduate dental program. They must also successfully complete a comprehensive certification examination that consists of the writ-

ten examination and a three-phase clinical examination.

Examinations

Written Examination (one day)

The written examination consists of two papers, given in one day during a morning and an afternoon session. A total of 300 multiple-choice questions test candidates' understanding of basic biomedical science, their applied clinical knowledge, and their clinical judgment.

Clinical Examination (three phases, six days)

Clinical I: This one-day written examination consists of four papers that require candidates to use clinical judgment in answering case-based objective and short-answer questions. It tests candidates' ability to recognize, diagnose and manage various clinical conditions and situations, and includes a case diagnosis and treatment plan.

Clinical II: During two days, candidates must complete identified restorative procedures on specified typodont teeth in a simulated patient (manikin). Procedures can include amalgam, composite resin, cast gold and provisional restorations. A diagnostic wax reconstruction on articulated casts is also required.

Clinical III: Candidates must perform three restorative procedures on human subjects in three days.

Objective Structured Clinical Examination (one day)

In this one-day, patient-centred, multiple-choice examination, candidates review diagnostic information, such as case histories, radiographs, casts, photographs and models. With a designated amount of time for each clinical station, candidates must apply their basic biomedical science and clinical knowledge to make clinical decisions. The advantage of this type of examination is that it tests high cognitive levels (analysis, synthesis and application) objectively in a simulated clinical situation. Currently, the OSCE is used only in the certi-



cation process for graduates of CDAC-accredited programs.

The OSCE requires significant funds, because test development, review, validation and evaluation are labor-intensive. In addition, for security reasons, the exam is held on the same day in a number of locations. Therefore, many sets of examinations and support materials are needed.

Evaluation Procedures

The format of NDEB examinations is set according to established and published standards of acceptable performance. These performance standards are based on detailed evaluation criteria for each examination component and procedure. Examiners and committees develop the performance standards and evaluation criteria, which are then approved by the board. Teams of examiners evaluate the clinical components (parts of Clinical I, II and III). The examiners are calibrated prior to each evaluation session to reinforce the evaluation criteria and performance standards, and to maintain consistency in evaluation and fairness for the candidates. The performance standards and evaluation criteria are reviewed and revised annually to reflect evidence-based (scientifically-proven) advances in dental education and general practice.

The written examination, the OSCE and components of Clinical I are graded by computers to allow specific and sophisticated statistical analysis of the performance of candidates on particular examination items. These analyses form the basis for the ongoing review and revision of the examination. A combination of individuals who possess knowledge of the content and evaluation expertise are drawn from both Canadian dental education programs and general practice to develop and test the validity of the examination components.

Detailed information regarding examination content, procedures, fees, logistical details and suggested reference texts is provided to all candidates.

Conclusion

As the most important and recent chronological developments have shown, testing for general practice certification by the National Dental Examining Board of Canada is a dynamic process. Examinations will continue to be refined to keep up with scientific developments that affect dental practice, the fine-tuning of evaluation mechanisms, and the redefining of intraprofessional relationships and responsibilities.

By virtue of its mandate, NDEB has played a primary role in establishing and ensuring a national standard of competence for entry into the practise of general dentistry in Canada. With recent changes to the certification and examination process, NDEB and the provincial licensing authorities will be well-prepared to provide valid and reliable evaluations of an individual's abilities to meet that national standard. ■

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Dr. Jack Gerrow is an associate professor in the faculty of dentistry, Dalhousie University, and executive director and registrar of the National Dental Examining Board of Canada.

Reprint requests to: Dr. Jack D. Gerrow, the National Dental Examining Board of Canada, 100 Bronson Avenue, Ottawa, Ont., K1R 6G8.

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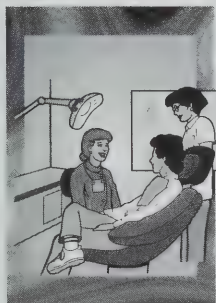
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DENTAL EDUCATION



Trends in Dental Education: A Literature Review

Ian C. Bennett, BDS, DDS, MSD

Marcia A. Boyd, DDS, MA

ABSTRACT

The dental literature for the past 30 years, with emphasis on recent publications, was reviewed for articles on trends in dental education. A keyword search of the MEDLINE database identified 6,055 papers, from which those most likely to predict future trends are considered in this article. Particular emphasis is placed on the Institute of Medicine of the National Academy of Sciences 1995 study, "Dental Education at the Crossroads: Challenges and Change." Reactions to this U.S.-based study are also detailed.

Trends in curriculum analysis, curriculum change and reform, curriculum length, dental school financing, dental student costs, dental school and university relationships, dental school patient care, dental research, accreditation, oral health and trends from outside North America are documented. In addition, a series of predictions are made, and a brief bibliography of the 51 most relevant references is included.

SOMMAIRE

On a revu la littérature dentaire des 30 dernières années, tout en mettant l'accent sur les publications récentes, afin de trouver des articles sur les tendances dans l'enseignement dentaire. Des recherches dans la base de données MEDLINE ont révélé 6055 titres. Dans cet article, on s'intéresse à ceux qui prédisent les tendances à

venir avec le plus de probabilité et on accorde une importance toute particulière à une étude faite en 1995 par l'Institute of Medicine de la National Academy of Sciences et intitulée: *Dental Education at the Crossroads: Challenges and Change* (L'enseignement dentaire à un carrefour: défis et évolution). De plus, on examine les réactions que cette étude américaine a soulevées.

Par ailleurs, on explique les tendances qui se dessinent dans l'analyse des cours, leur évolution et leur réforme, leur durée, le financement des écoles de dentisterie, les frais de scolarité, les relations entre les écoles de dentisterie et les universités, le soin des patients dans les écoles de dentisterie, la recherche dentaire, l'agrément, la santé bucco-dentaire et les tendances à l'extérieur de l'Amérique du Nord. Enfin, on présente une série de prévisions ainsi qu'une bibliographie comprenant les 51 titres jugés les plus pertinents.

Introduction

The Canadian Dental Association created a Task Force on the Future of Dental Education in Canada in 1994 to prepare recommendations for any necessary changes in Canadian dental education. The task force commissioned a review of the dental literature relating to trends in dental education in North America and, when relevant, in the rest of the world. This review was presented orally at a special session held at the CDA annual

meeting in August 1995 and has been updated and modified for publication here.

The task of reviewing the literature relating to dental education trends was a formidable one. A MEDLINE search for the 30-year period from 1966, when the MEDLINE database began, to September 1996, using the keywords "dental" and "education" found 3,484 papers indexed in the main directories and another 2,571 papers indexed in the subsidiary directories (nursing and allied health, and health planning and administration). Papers in journals not indexed by MEDLINE and books on the subject were not included. Some overlap was possible between the main and subsidiary directories, and many papers not directly relevant to the mandate of the task force were included in the total. However, papers were bypassed when their content was judged to be irrelevant to the current review.

Although a small selection of the references was reviewed, an attempt is made in this article to cover the most relevant articles and present some of the other highlights. The enormity of the reviewing task is almost exceeded by the need to present a meaningful selection in the limited space available. This article begins with a review of the U.S. Institute of Medicine (IOM) study, followed by a review of several other areas where trends can be discerned: curriculum analysis, curriculum

change and reform, curriculum length, dental school financing, dental student costs, dental school and university relationships, dental school patient care and clinic operation, dental research, accreditation, oral health and trends from outside North America.

The IOM study is presented first because it is probably the most significant, comprehensive and current work that is relevant to North America, even though it almost exclusively focuses on the dental education milieu of the United States. In spite of significant differences between U.S. and Canadian dental education, Canadian dental educators know there are many similarities between the two. This is reinforced by the reciprocal accreditation agreements between the respective commissions on dental accreditation in Canada and the U.S. The differences between educational programs in Canada and the world beyond the U.S. are much greater.

The Institute of Medicine Study

The Pew Foundation's efforts to study issues in professional education provided the initial stimulus for the study.¹ The Foundation's report, *Health Professions Education for the Future: Schools in Service to the Nation*, emphasized the overcrowded, inflexible, traditional dental curriculum's difficulty in adequately responding to emerging trends in demography, technology and care delivery. It identified a general lack of opportunity for students to deliver care to diverse segments of the population in community settings and to work as a team member with other health care professionals. Further support for the IOM study was provided by other groups, including the American Association of Dental Schools (AADS), the American Dental Association (ADA), the American Fund for Dental Health, the American Association for Dental Research and the National Institute for Dental Research.

The IOM's mandate was to: "suggest ways to prepare future dental care providers for the changing needs of the population; develop strategies for dental facul-

ties to achieve greater stability in the university setting; and suggest ways to increase the relevance between dental practice and dental school curriculum."²

The IOM study was probably the best-funded study for many years and is quite recent, having been published in 1995. The process behind the study was interactive, with workshops, public hearings and position papers designed to promote wide and varied participation by the entire dental profession. The study drew upon the combined opinion of a large number of leaders in the education, research and practising sections of the dental profession in the U.S., as well as senior administrators of academic health centres and universities, and business people. Further, a cadre of expert consultants was engaged to provide background papers on specific topics. The study committee made several site visits and conducted interviews, meeting with over 500 people. The AADS Council of Deans also provided input.³

The IOM Committee on the Future of Dental Education had 18 members and was supported by a staff of five. It began its work in 1993, following preliminary discussions dating back to 1990, and published its report in January 1995. The IOM study is contained in the 345-page book, *Dental Education at the Crossroads: Challenges and Change*.⁴ It was written by the committee, edited by Dr. Marilyn J. Field, and published by the National Academy Press in Washington, D.C., in 1995.

The book begins with a review of dental education's context, its evolution and its relationship with oral health objectives. Curriculum receives the most attention in "The Mission of Education" chapter. The relationship to research is covered in "The Mission of Research," and the "Mission of Patient Care" discusses the role of both intra- and extra-mural patient care activities.

The chapters that follow these discuss the relationships with the university, the profession and the public, including licensure, certification and accreditation. Finally, the chapter "A Dental Work Force for the Future" enlarges upon the

numbers and composition of the dental team of the future and the difficulty in forecasting future needs.

None of the committee's 22 recommendations can be considered new or radical. The first three relate to the oral health status of the population, the development of funding for oral health care, and the increase in the number of recent graduates employed by government to work in underserved areas. Recommendations 4 to 8 are more directly related to curriculum.

Recommendation 4 suggests that each dental school "set explicit targets, procedures and timetables for modernizing courses," and lists five steps that should be included. One is to "shift more curriculum hours from lecture to guided seminars and other active learning strategies that develop critical thinking and problem-solving skills." There is minimal discussion of the obvious and significant cost impact of a more faculty-intensive model of instruction.

Recommendation 5 proposes that future dental practitioners be prepared for "more medically-based modes of oral health care and more medically-complicated patients." It also suggests that dental educators work with their colleagues in medical schools and academic health centres to achieve this.

A specific of Recommendation 4 is to "design an integrated basic and clinical science curriculum that provides clinically-relevant education in the basic sciences and scientifically-based education in clinical care." A specific of Recommendation 5 is to "move toward integrated basic science education for dental and medical students." These two specifics seem to conflict; it would be difficult to achieve both at the same time.

Recommendation 6 suggests that each dental school "prepare students and faculty for an environment that will demand increasing efficiency, accountability and evidence of effectiveness" and that "dental students and faculty participate in efficiently-managed clinics and faculty practices." Six specific steps are listed that should be included in the proposed changes.

Recommendation 7 proposes that "post-doctoral education in a general dentistry or specialty program be available for every dental graduate." The committee suggests that this goal be attained within five to 10 years by "creating new positions in advanced general dentistry and discouraging additional specialty residencies unless warranted by shortages of services that cannot be provided effectively by other personnel."

Recommendation 8 suggests that each dental school "supplement tenure-track positions with other full-time non-tenured clinical or research positions" with the purpose of providing "greater flexibility in achieving teaching, research and patient care objectives."

The dental licensing recommendation includes an encouragement to: develop valid, reliable and uniform clinical examinations; eliminate live patients in examinations; study recertification; remove barriers to the movement of dental personnel; and eliminate regulations that restrict dentists from working with allied dental personnel in ways consistent with their education.

Three recommendations relate to research, three to patient care, four to relationships with the parent university, including administration and finance, and three to personnel, including the recruitment of under-represented minorities. All of these could have a significant impact on the educational program as a whole if and when they are implemented.

In addition to the monograph itself, a series of background papers were published as a special issue of the *Journal of Dental Education* in January 1995. (This issue¹³ also includes an executive summary of the IOM study.) The eight papers were solicited by the committee to aid in its deliberations, and are annotated as follows:

1) White et al⁵ review oral health changes in the U.S. population over the last 25 years and provide its current status, based on recent studies. Although such detailed Canadian studies do not exist, one can assume that the status of the Canadian popula-

tion is somewhat similar and has changed in a parallel way. Immigrant population groups seem to show a very different picture.

- 2) Bader and Sugars⁶ describe variations in dentists' treatment decisions and the development of practice guidelines. There is special emphasis on the absence of strong supporting evidence for the assumed facts which are the basis of many treatment decisions. The need for outcomes research and clinical guidelines is stressed.
- 3) The third paper discusses curriculum development since 1926.⁷ Tedesco provides an extensive review of the changes in dental curricula since the writing of the Gies report, almost 70 years ago. The distribution of course hours is often used to measure curriculum content or importance. Surprisingly, the inadequacy of this practice is hardly mentioned in Tedesco's review. The efforts of the consortium of North American dental schools, including many in Canada, to compare curricula by codifying the specifics taught rather than the hours taken to teach them, are not described in detail.
- 4) Greenspan⁸ enlarges on the future prospects for oral health science and technology. He assesses the impact of the advances in science on the current and future practice of dentistry. Specific mention is made of: caries, craniofacial anomalies, dental biomaterials, oral soft tissue and salivary gland diseases and oral manifestations of systemic disease, periodontal disease, and temporomandibular joint disorders. The paper argues that dental schools should not limit research to narrow or immediate problems, but be willing to pursue broader areas of research that may not have obvious immediate application to current problems.
- 5) Jeffcoat et al⁹ describe the effect of research and technology transfer on the practice of dentistry. Specific areas they ex-

plore are diagnosis, restorative dentistry and periodontics. The paper stresses that curricula should be flexible enough to adapt to new knowledge and techniques and to encourage a commitment to life-long learning. An ability to critically assess the research literature is of great importance.

- 6) Douglass and Fein¹⁰ review the financing of dental education and analyze the current status of, and recent financial trends in, dental schools. Overall, for U.S. dental schools during the three years between 1989 and 1992, revenue from state and local sources declined, and revenue from student tuition and fees increased. There were also modest increases in federal support. In 1991-92, the 55 dental schools showed a deficit of over \$60 million. Figures for the 20-year trends show even more dramatic changes in distribution. Since most educational innovation needs financial support, the ability to generate new revenue sources or redistribute old funds is critical to implementing curriculum change.
- 7) Guarino¹¹ reports on many issues relating to licensure, certification and accreditation. While this does not receive major emphasis in the IOM study, the driving effect of licensing examinations on curricula has been observed for some time. Current and future changes in the licensing of Canadian dentists will have to be evaluated as to their effect on the curricula of Canadian dental schools.
- 8) Capilouto et al¹² discuss the methods for projecting the future supply of dental personnel and the future demand and need for dental services. The notoriously difficult and error-prone area of personnel projections and requirements, treatment demand and need forecasting is discussed in detail. This will be a matter for considerable discussion and disagreement.

The Spring 1995 issue of the *Journal of the American College of Dentists* includes a series of reactions to the IOM study and its recommendations, including com-

ments by Niessen¹⁴ on oral health, Bradley¹⁵ on education, Löe¹⁶ on research, Hasler¹⁷ on patient care, McCallum¹⁸ on the relationships between dental schools and universities, Yapple¹⁹ on accreditation and dental licensure, and Stamm²⁰ on workforce issues.

Trends in Curriculum Analysis

As mentioned, the number of curriculum hours in courses is not an accurate measure of curriculum content. In 1976, ADA's Council on Dental Education, in conjunction with AADS, conducted a curriculum study. When the results were published,²¹ it became apparent that little could be gained from the figures. The first problem was that different schools used different names for similar courses (but these variations were far from explicit). More importantly, no one knew if 50 hours of prosthodontics, for example, covered the same material and with the same emphasis in each school. Chances are that it did not.

Since that time, the Curriculum Analysis Tools (CATs) system has made it easier for faculty, students and staff to access the full detail of curriculum content in any medical²² or dental school.^{23,24} The comparison of curricula between schools should also become easier. Computerized curriculum analysis has been applied to basic science curricula in medical schools,²⁵ to medical curricula using MeSH keywords²⁶ and as an on-line system in a dental school.²⁷

Many dental schools in Canada have joined the consortium that is funding the development of the CATs system, which, when completed, will enable faculty, students and staff at Canadian schools to access the details of their own curriculum. Hopefully, they will also be able to make comparisons with the curricula of other schools. This could be an important information source for accreditation, although care will have to be exercised to avoid forcing every curriculum into the same mould.

Trends in Curriculum Change and Reform

In an address at the 1987 FDI meeting, Allen²⁸ discussed the philosophy and rationale of curriculum change. His speech summarized well the overall principles of curriculum design and change. At the same meeting, Boyd²⁹ discussed trends in North American dental curricula, emphasizing the necessity of adding new material as knowledge expands, the difficulty of eliminating or reducing old and redundant material, and the need to stress concepts. These factors have led to pressure on students and to curriculum overcrowding.

At relatively recent annual meetings,^{2,30-33} AADS leaders not only stressed the need for curriculum change, but also set in motion the initiatives that led to the IOM study.

At the same time, the concept of competency-based curriculum was developing.³⁴ It embraced a different teaching and learning approach as well as changes in the evaluation strategy that encompassed critical thinking, information management and performance evaluation, all of which are central to supporting life-long learning and continued competency.³⁵ The methodology it suggested was problem- or case-based learning, which integrates basic, clinical and behavioral sciences rather than discipline- or content-oriented models.

Many discussions and papers about curriculum change imply that little has changed since Gies³⁶ published his report in 1926 (note that Canada was included in Gies' study). This may be due to the tendency to conclude that if there were 200 curriculum hours on a certain subject in 1926, and 200 on a subject with the same title in 1996, nothing has changed. We know that, in fact, some content areas have expanded and new courses, such as biomedical ethics, implantology, and dental geriatrics have been developed.

For illustrative purposes, consider the following. In 1950 — 24 years after Gies' report and 46 years ago — the University of Liverpool Dental School listed 2,000

course hours on dental mechanics (today it would be called pre-clinical prosthodontics).³⁷ By 1953, the course had been reduced to 700 hours, but still included, among other things, practical experience in taking plaster impressions of a full dentition, and making vulcanite dentures, cast lead alloy custom impression trays, swaged metal partial dentures (in technique metal) with wrought clasps and other even less useful items. It is unlikely that these items are taught in current pre-clinical prosthodontics programs.

There has been curriculum change. And while curricula can always be improved, dental education institutions do not need to be ashamed of their curricula. Traditionally, conservative cautious consideration of curriculum change has served dental education well.³⁸

Course content will continue to be revised and will prove to be much more important in curriculum change than reshuffling content into different courses. The annual teaching conference, sponsored for many years by CDA and the Association of Canadian Faculties of Dentistry (ACFD) with help from the Dentistry Canada Fund (or its predecessor organizations), has also been an important agent of change in Canada. The conference has benefited both the individual disciplines and more general areas of the teaching program.

Current emphasis on outcomes assessment,³⁹ the definition of competencies for licensure,⁴⁰ the achievement of competency,⁴¹⁻⁴² problem-based learning⁴³⁻⁴⁴ and social responsibility⁴⁵ will ensure that progress continues. However, as Curry suggests,⁴¹ today's relentless economic, cultural and technological changes threaten to make curricula in professional schools obsolete before students complete their programs.

Trends in Curriculum Length

For many years, there have been discussions about lengthening the dental curriculum to accommodate the constant adding of new content. In 1986, CDA, the

National Dental Examining Board of Canada (NDEB) and ACFD sponsored a national symposium on a pre-licensure year in Canada.⁴⁶ Formicola³⁰ discusses the postdoctoral year following dental school, and this seems to fit with the IOM recommendation of making a postdoctoral experience available for all graduates to assist in the transition from supervised to independent practice. This option seems more likely than a fifth year of dental school, but it remains to be seen how long it will be voluntary. The State of Delaware, in the U.S., has required a year of postdoctoral experience as a prerequisite to licensure for many years. Perhaps other states and provinces will introduce a similar requirement. On the global scene, the United Kingdom, Sweden, Germany, France and Denmark require some postgraduation experience before independent practice.⁴⁷ The Republic of Ireland and the Netherlands are in the process of developing similar requirements.

Trends in Dental School Financing

Traditional sources of dental school revenue are threatened. Because all government levels have large debts, it seems unlikely that their current support for dental education and research can be maintained. Since dental school costs are higher than most other university programs, dental programs will be under pressure and some may face closure. Many small Canadian schools that do not benefit from the economies of scale, will be particularly vulnerable. The situation will force schools to raise funds from alumni, the corporate sector and other special interest groups for both capital and operating costs.

Dental Student Costs

Tuition and other educational fees seem likely to rise at a greater rate than inflation, as government funding remains flat or decreases. Along with general increases in tuition, dental students will probably be required to pay for a greater proportion of their educa-

tion as well as "practicum" fees, lab fees and fees for laundry, supplies, curing lights and computers. Student indebtedness at graduation will also increase.

Dental School and University Relationships

Dental schools will continue to be under pressure to justify their continued existence in their parent universities. This will be particularly true when the needs for extensive remodelling, rebuilding or equipment replacement arise. Because of its high cost, the dental program will continue to be an easy target for budget-cutting exercises or for elimination. This probability makes it necessary for each dental school to keep its parent university's senior administrators apprised of its needs and productivity. Dental schools must strengthen their political connections with their provincial governments if they are to ensure that their position in universities are well understood by successive governments — making it difficult for university administrations to believe that they can recapture, without penalty, any funding they received for dental education.

In response to the need for cost-efficiency, and perhaps in keeping with the recommendations of the IOM study regarding greater integration between dentistry and medicine, the faculty of dentistry at the University of Alberta merged with the faculty of medicine to become a department within a newly-created faculty of medicine and oral health sciences.⁴⁸ The implementation of this model has caused great concern within the other faculties of dentistry in Canada, and will be watched closely for evidence of effectiveness, and maintenance of professional support and integrity.

Trends in Dental School Patient Care and Clinic Operation

Dental school clinics are more expensive than ever to operate, and discounting treatment fees adds to their growing deficits. There will be a demand to make clinics more productive financially

to at least cover a greater share of their costs without sacrificing academic and clinical quality.⁴⁹ In fact, most schools are already charging "what the traffic will bear" for their services. Much more is not possible. Of course, treatment given by dental students could be expedited by more vigorous faculty action and more aggressive clinic administration, but old habits die hard. However, if dental students accomplish more treatment in their clinical years, the extra experience should enhance their clinical ability.

There has also been a call for dental education to be more involved in community clinics.⁴⁵ As valuable as they are, in times of fiscal restraint it is difficult to mount new programs. New programs and existing extra-mural programs are often the first to be eliminated because of their high cost.

Clearly, patient care will have to become more patient-centred. The continuation of clinical programs that only provide the treatment requirements that students must complete have long been untenable. Comprehensive care and treatment outcomes need to be more important than procedures. Costeffectiveness, for both patients of the dental school and future patients of the graduates, will have to be considered in the decision-making process.⁵⁰

Trends in Dental Research

It is unlikely that government funding will be maintained, even at the current reduced levels, because all governments are in debt. Reductions in government funding have led to more clinically-oriented corporate-funded research. The pressures of competing for research funding from all sources will increase. If university administrations continue to judge faculty performance on the basis of the research dollars they attract, the position and stability of dental schools will be continually challenged.

Many educators hold the unchallenged beliefs that faculty members engaged in research are automatically excellent teachers, and that those not engaged in research are poor teachers. Both views may not

always be true. No studies to support either view were found.

Trends in Accreditation

The considerable administrative burden, in direct and indirect costs, of preparing for accreditation site visits will lead to demands for relief. Decreasing the frequency of visits to schools that have consistently strong programs and increasing visits to the less strong ones might alleviate some of the burden. The Council on Dental Education in Canada has led the way in changing (or expanding) the accreditation focus from "process only" to include "curriculum outcomes."³⁹ It is hoped that this trend will continue and that accreditation will become more competency-based.

Trends in Oral Health

The changing oral health status and age distribution of the various populations served by dental graduates, both pre- and post-doctoral, will have a significant influence on the content and emphasis of dental education. Among the oral health changes we have seen are a substantial reduction in dental caries, a reduced number of edentulous persons, an increased interest in esthetic dentistry, as well as geriatric and orthodontic care. These changes need to be monitored closely to ensure that curricula reflect changing patient needs.

Trends From Outside North America

The Nuffield report⁵¹ on dental education in the United Kingdom — probably the most significant study in that jurisdiction — was relatively unrelated to the Canadian scene. Some of its recommendations, however, are of interest as dental education programs and licensing bodies look toward the future. Specifically, Recommendations 1, 2 and 3 on required supervised work before licensure, Recommendation 26 on auditing clinical standards, and Recommendation 30 on increased use of the media for dental health education merit consideration.

Conclusion

This review, although incomplete, tempts one to predict, with some trepidation, trends for Canada. Predictions are always dangerous, and make one vulnerable. Time will tell, but an attempt is made to provide some possibilities. The predictions are:

- Students will pay a higher proportion of the cost of their education.
- Fundraising for capital and operating costs, from non-government sources, will be an important role of dental school administrations.
- Dental school clinics will have to become more patient- than procedure-oriented by providing comprehensive care to all of their patients.
- Patient-friendly attitudes, increased efficiency and high quality care will be required if dental school clinics are to cover a greater proportion of their overall costs.
- Competencies founded in both basic and applied scientific knowledge will continue to drive changes in patient care and therefore in curriculum.
- There will continue to be threats of closure, if not actual closures, of some Canadian dental schools.
- Regional grouping of schools is unlikely because of the high capital costs of building a regional versus a provincial dental school facility, and the small patient pool in any one location. However, former faculty clinics could be used as satellite clinical sites, which would reduce some of the capital costs of expanding the clinical facilities at one location.
- Dental schools will not continue to be subsumed by medical schools.
- Dental faculties will seriously consider privatizing if threatened with closure or absorption by medical faculties.
- Dental practice will have to become more efficient, effective and cost-conscious. Dental practice management will receive more emphasis in either dental education or a postgraduate experience.
- As in the past, studies on the need for curriculum change will

continue and further recommendations will be made.

- Competition for research funds will increase, making them even more difficult to obtain.
- Tenured faculty members who have lost grant support and have a very limited teaching role will become financial burdens on their institutions and may be required to expand their teaching responsibilities. To accomplish this, they may need some retraining.
- The number of non-tenured and non-tenure track faculty members, often recent graduates, will increase and they will be principally involved in patient care activities.
- The dental curriculum will be extended in time by some combination of a longer academic year, an additional academic year and a required postgraduate experience.
- Increasing attention will be paid to implant dentistry, esthetic dentistry, geriatric dentistry and dentistry for special needs patients.
- General practitioners will probably become capable of treatment modalities now only performed by specialists.
- Practitioners will need to expand and renew the knowledge they gained during their pre- and postdoctoral programs, through life-long learning and continuing competency.
- Continuing education provided by dental schools will be important both for the income it can generate and for its contribution to the knowledge and continuing competency of practitioners.
- Computers will continue to grow in importance both for patient management and computer-assisted instruction, and each dental student enrolled in a predoctoral program will be required to have a specified type of personal computer.
- Computerized curriculum analysis will become readily accessible to all.
- Outcome and competency-based measures for dental education will outweigh structure and process in the accreditation review. ■

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GERIATRIC DENTISTRY



A Comparison of Moderate and High Users of Alberta's Universal Dental Plan For the Elderly

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ABSTRACT

The characteristics and service utilization of 2,071 high and 2,337 moderate users of Alberta's dental plan from 1978-79 to 1990-91 are reported. High users are those who used the plan for 14 consecutive years; moderate users are those who used the plan in seven of the 14 years. Both groups were over 74 years of age in 1991-92.

Compared to high users, moderate users lived in less urbanized regions, visited denturists more often and received far more complete dentures and fewer partial dentures. As a percentage of their total annual plan expenditures, moderate users spent less on diagnostic, preventive, periodontal and restorative services and much more on removable prosthodontic and denturists' services. However, during the study period, the moderate users increased their annual relative expenditures for diagnostic, preventive and, especially, periodontal services, and decreased them for prosthodontic services.

With respect to specific preventive and periodontal services, the percentage of total annual expenditures for dental prophylaxis, topical fluoride applications, periodontal scaling, gingival curettage, and combinations of these, was much higher for the high user group. Despite these differences favoring the high user group, during the 14 year period, the moderate user group considerably in-

creased its relative expenditures for dental prophylaxis, topical fluoride and periodontal scaling services.

While the observed differences in service expenditures between high and moderate users were anticipated, the shift over time to using more preventive and periodontal services by both groups was an encouraging harbinger of the "new elderly" dental patients.

SOMMAIRE

Dans cet article, on présente les caractéristiques et les services utilisés par 2071 grands usagers et 2337 usagers moyens du régime de soins dentaires de l'Alberta de 1978-1979 à 1990-1991. Les grands usagers sont ceux qui ont eu recours à des services dentaires 14 années de suite, et les usagers moyens sont ceux qui en ont eu recours sept années sur les 14. Les deux groupes étaient âgés de plus de 74 ans en 1991-1992.

Contrairement aux grands usagers, les usagers moyens vivaient dans des régions moins urbanisées, ils ont visité le denturologiste plus souvent et ils ont reçu beaucoup plus de prothèses complètes et moins de prothèses partielles. En pourcentage de leurs dépenses annuelles globales dans le régime, les usagers moyens ont dépensé moins que les grands usagers pour des services diagnostiques, préventifs, parodontaux et restaurateurs, mais beaucoup

plus qu'eux pour des prothèses amovibles et des services de denturologie. Dans le groupe des usagers moyens, cependant, les dépenses relatives annuelles ont augmenté pour les services diagnostiques, préventifs et, surtout, parodontaux, et ils ont diminué pour les services de prosthodontie.

Pour ce qui a trait à des services préventifs et parodontaux spécifiques, le pourcentage des dépenses annuelles globales pour les prophylaxies dentaires, les applications topiques de fluorure, les détartrages parodontaux et les curetages gingivaux, et une combinaison de ces divers traitements, a été beaucoup plus élevé pour le groupe des grands usagers. Malgré ces différences en faveur de ce groupe, il y a eu, durant la période de 14 ans, des hausses considérables des dépenses relatives parmi le groupe des usagers moyens pour les prophylaxies dentaires, les applications topiques de fluorure et les détartrages parodontaux.

Bien qu'on ait prévu ces différences dans les dépenses de services entre les grands usagers et les usagers moyens, la demande progressivement accrue de services préventifs et parodontaux parmi les deux groupes est un signe encourageant annonçant le «nouvel aîné» que la profession dentaire peut s'attendre à recevoir comme patient.

Introduction

Alberta's dental plan for residents over the age of 64, which started in 1973, has been described in previous papers.^{1,2} In one of these, the numbers and types of dental services provided under the plan were examined cross-sectionally each year from 1978-79 to 1991-92.² These cross-sectional analyses clearly show that during this period there were large increases in the relative percentages of preventive and, especially, periodontal services, and decreases in removable prosthodontic services, provided to those using the plan.

Although analyses such as these provide good descriptions of the year-to-year experiences of the dental plan users, they do not permit an assessment of the experience of the same group(s) of users over time. To achieve this, groups of patients (cohorts) must be identified and their experience under the plan examined longitudinally.

An earlier longitudinal analysis of the plan's retrospective utilization by all users in 1991-92 revealed that some patients sought dental care quite regularly. One group of 2,071 patients (all over 74 years of age in 1991-92) had used the plan in each of the 14 years covered by our database.³ Other groups had lower utilization rates. Almost 6,000 patients (of whom 2,337 were over 74 years of age in 1991-92) had used the plan in seven of the 14 years.

Possible differences in both the quantity and types of dental services provided to groups of patients such as the high and moderate users mentioned above under the Alberta dental plan, over time, and in the characteristics of these groups — age, gender, geographic location and main dental provider — have not previously been described. This paper aims to describe these differences. Specifically, we propose to examine and compare the quantity of complete and partial dentures, as well as the annual expenditures for general dental services and for specific common preventive and periodontal services that have been provided to a group of high users

and a group of moderate users of the plan between 1978-79 and 1990-91.

Similar data in North America are scarce. Identical longitudinal data on specific groups of older high and moderate users who have had dental insurance for as long are unavailable. In the United States, white adults over 64 years of age with dental insurance sought dental care in 1989 more frequently (62.7 per cent) than their uninsured counterparts (44.2 per cent).⁴ The mix of dental services received by patients of all ages in the U.S. varied according to the amount of dental co-insurance payable by the patients,⁵ whether the dentists were high or low users of a dental insurance plan,⁶ and whether, in another dental plan, the patients characteristically had either high or low expenditures.⁷ In Canada, Leake et al⁸ reported large and often significant differences in dental relative value units (RVUs) for dental services received by patients 50 years of age and older in four Ontario regions. Using 1986 utilization data reported by dentists from several Canadian provinces, House⁹ provided the mean times to provide many specific dental services to high-care dental patients of various ages.

As well as the geographic and dental provider differences that may exist between the high and moderate users of the plan, differences in the general and specific types of dental services provided to each group are likely. It is hypothesized that the high users received relatively fewer prosthodontic services (especially complete dentures) and relatively more preventive and periodontal services. Consistent with the findings of other Canadian studies,^{8,9} one may also speculate about the main types of preventive and periodontal services provided to the two groups. The most common services are likely dental prophylaxis and possibly topical fluoride applications under the preventive category, and scaling and root planing under the periodontal category. Although it appears not to have been studied elsewhere, it

is also important to learn the extent to which combinations of preventive and periodontal services are provided annually (overall and to the same person), and whether the services received changed over time. The dental prophylaxis/topical fluoride and dental prophylaxis/periodontal scaling combinations are of particular interest.

Methods

The general data processing and statistical methods used with this large dental plan database have previously been described.² For this historical, longitudinal analysis, the unique identification numbers of each user in 1991-92 who had used the plan for either seven or 14 years and was over 74 years of age were identified. By purging all patient records without these identification numbers from the data file for each of the preceding 13 years, the appropriate data for this longitudinal analysis of one high-user cohort (n=2,071) and one moderate-user cohort (n=2,337) were derived.

The age, gender, region of residence and dental provider type of the two cohorts were determined. The main indicator of utilization employed in this analysis was the percentage of annual total expenditures by the plan for each general category (preventive and periodontal) or specific type of dental service. Total costs were adjusted for inflation to 1978-79 dollars using the "all items" Consumer Price Index (CPI) for Alberta.

Although data are available for each of the 14 years from 1978-79 to 1991-92, because of space limitations, the annual data presented here cover only three years during this period, 1978-79, 1984-85 and 1990-91. These representative years and six-year intervals do reflect the service utilization patterns over the 14 years, although overall, the service utilization declined in 1991-92, probably due to the lowering, in May 1991, of the maximum total expenditures from \$1,200 per person over two consecutive years to \$960.²

Table I**Characteristics of Moderate and High User Groups**

	Moderate	High
Mean age (years) in 1991-92	80.0	81.1
Number of patients	2,337	2,071
75 to 79 years	55.9%	36.3%
Female	57.4%	63.5%
Residence:		
Metropolitan*	71.8%	82.7%
Northern Alberta	11.3%	4.2%
Type of Provider Used:		
Dentist only	52.0%	90.4%
Denturist only	11.6%	0.0%
Both	36.3%	9.6%

* Metropolitan residence means Calgary or Edmonton

Results

The limited number of patient characteristics available in the Alberta plan database for the moderate and high users are listed in **Table I**. Although the average age of the two groups is similar, the moderate user group has proportionately more persons between 75 and 79 years of age and fewer females. Moderate users tend to live in the less urbanized (outside Edmonton and Calgary) and more northern regions of Alberta. They also use denturists much more often as their main dental care provider than the high users, who seldom used denturists and, when they did, it was always in combination with a dentist.

The moderate user group received many more dentures than the high user group over the 14-year period (**Table II**). About six of 10 patients in the high, and three of 10 in the moderate user group did not receive any dentures under the plan between 1978-79 and 1991-92. For those who did receive dentures, complete dentures were provided most often to the moderate user group (means of 1.4 and 1.1 per patient). The high user group was provided most often with partial dentures (means of 0.6 and 0.7 per patient).

Relative to total expenditures, the moderate users have proportionately far lower expenditures each year than the high users for diagnostic, preventive, restorative and periodontal services and proportionately much higher expenditures for removable prosthodontic and denturists' services (**Table III**).

In examining the utilization experience of each user group over time, various changes are evident (**Table III**). With the moderate group, the primary changes have been the growth in the percentage of total ex-

penditures for diagnostic, preventive and, especially, periodontal services, and the decline in expenditures for removable and fixed prosthodontic services. The percentage of the moderate users' total expenditures for denturists' services increased slightly over time (**Fig. 1**). There were fewer large changes with the high users, but their percentage of expenditures did decline for restorative and fixed prosthodontic services, and increased greatly for periodontal services (**Fig. 1**). They also increased their use of denturists' services, but to only 2.2 per cent of total expenditures in 1990-91.

Table III also shows the total and mean expenditures per patient made by the plan for each group. For the high user group, the total expenditures, when adjusted for inflation, declined in 1990-91, as did the mean cost per patient. Although, consistent with their much smaller numbers of patients, the total expenditures for the moderate users were lower than for the high users each year, their mean expenditures per patient were higher in 1978-79 and 1984-85.

Table IV presents the utilization experience of the two user groups as the percentages of total expenditures for four specific preventive and periodontal services: topical fluoride applications, dental prophylaxis, periodontal scaling and root planing, and gingival curettage. These four services

Table II**Complete and Partial Dentures Received by Moderate and High User Groups From 1978-79 To 1991-92**

Denture Type	Moderate (mean*)	High (mean*)
Complete upper	1.4	0.5
Partial upper	0.2	0.6
Complete lower	1.1	0.1
Partial lower	0.4	0.7
TOTALS	3.1	1.9
N(%) Patients never receiving a denture	721 (30.9)	1,279 (61.8)

* Means per patient receiving one or more dentures in the 1978-79 to 1991-92 period are based on n=1,616 for the moderate users and n=792 for the high users. The mean number of dentures received overall was 2.14 for the moderate and 0.73 for the high user groups.

amounted to between 80 per cent and 93 per cent of all expenditures for the preventive and periodontal categories of dentists' services.

In each year, the relative expenditures for each of these four services are much greater for the high user group. However, the differences between the two user groups narrowed markedly over time. Relative expenditures for high users were four to eight times greater than for low users (depending on which service is considered) in 1978-79, but only 1.4 to three times greater in 1990-91.

Overall, with the moderate users, the percentages of total expenditures attributable to these four services rose 4.6 times, from 3.1 per cent in 1978-79 to 13.0 per cent in 1990-91. With the high users, these percentages nearly doubled, from 14.5 per cent to 25.6 per cent.

When each service is considered separately, other striking changes are apparent. Although

the percentages of expenditures for dental prophylaxis and gingival curettage show no, or only modest, growth, the periodontal scaling percentages increased greatly — about 15-fold (0.5 per cent to 7.6 per cent) for moderate users and about six-fold (1.9 per cent to 12.8 per cent) for high users. Even though the relative expenditures for topical fluoride applications are much lower each year than those for dental prophylaxis, they have had some growth, as shown by their increased share of total expenditures between 1978-79 and 1990-91, from 0.1 per cent to 1.0 per cent for moderate users and from 0.7 per cent to 2.1 per cent for high users (**Table IV**).

The expenditure percentages for the aggregated combinations of topical fluoride and dental prophylaxis services, and of dental prophylaxis and periodontal scaling services can be estimated from the data in **Table IV**. The topical

fluoride and dental prophylaxis combination accounts for 10.0 per cent to 12.8 per cent of total expenditures for high users and 2.3 per cent to 4.4 per cent for moderate users. The periodontal scaling and dental prophylaxis combination doubled for high users, from 11.2 per cent to 22.1 per cent of total expenditures, and nearly quadrupled for moderate users, from 2.7 per cent to 11.0 per cent during the 13-year period.

Discussion

In comparison to the moderate users, the high users consisted of more females, resided more often in metropolitan centres and mainly used dentists. The dental care findings match our previous findings regarding the receipt of greater amounts, different kinds and greater regularity of dental care experienced by other larger cohorts of plan users.¹⁰

Since dental utilization has been shown to be negatively asso-

Table III

Percentage Distributions of Expenditures for Dental Services Received by Moderate and High User Groups in 1978-79, 1984-85 and 1990-91

Dental Service Category	1978-79		1984-85		1990-91	
	Moderate (per cent/\$)	High (per cent/\$)	Moderate (per cent/\$)	High (per cent/\$)	Moderate (per cent/\$)	High (per cent/\$)
Diagnosis	6.7	14.3	7.8	15.8	11.2	16.4
Preventive	2.7	11.0	3.0	14.0	5.2	12.5
Restorative	18.6	39.2	20.7	37.3	18.3	31.7
Endodontics	4.0	5.9	4.8	6.9	4.9	5.3
Periodontics	1.0	5.6	3.1	8.4	9.4	15.4
Removable prosthodontics	31.8	11.9	25.2	10.5	17.5	10.8
Fixed prosthodontics	8.8	10.3	6.6	5.5	2.1	3.8
Surgery	3.9	1.3	3.0	0.9	2.5	2.6
Adjunctive	0.1	0.2	0.1	0.1	0.4	0.2
Denturists' services**	22.3	0.3	25.7	0.5	28.5	2.2
TOTALS (per cent)	99.9	100.0	100.0	99.9	100.0	99.9
(Expenditure, adjusted to 1978-79 \$000's)	(117)	(323)	(206)	(321)	(189)	(289)
Number of patients	532*	2,071	1,088*	2,071	1,451*	2,071
Mean \$ per patient	220	156	189	155	130	139

* In 1991-92 the moderate user group consisted of 2,337 patients; since, unlike the high user group, this group did not use the plan in each of the preceding years, their numbers vary each year.

** For the moderate group, 82 per cent, 66 per cent and 52 per cent of denturists' costs were for complete dentures in 1978-79, 1984-85 and 1990-91; the remainder of their costs were for denture relines, repairs and adjustments.

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Table IV

Percentage of Total Annual Expenditures for the Specific Preventive and Periodontal Services Most Often Provided to Moderate and High User Groups

Dental Service	1978-79		1984-85		1990-91	
	Moderate (per cent)	High (per cent)	Moderate (per cent)	High (per cent)	Moderate (per cent)	High (per cent)
Topical fluoride	0.1	0.7	0.3	1.4	1.0	2.1
Dental prophylaxis	2.2	9.3	2.3	11.4	3.4	9.3
Periodontal scaling	0.5	1.9	2.1	5.8	7.6	12.8
Gingival curettage	0.3	2.6	0.6	1.3	1.0	1.4
TOTALS	3.1	14.5	5.3	19.9	13.0	25.6

ciated with the wearing of complete dentures,¹¹ it was not surprising to find that the high user group had been provided with far fewer complete dentures under the plan (Table II). If high users did receive removable dentures, they were most likely to be partial dentures. This finding further supports our contention that high users have greater tooth retention than moderate users.

The differences between the groups observed in Table III regarding the greater percentages of total expenditures for diagnostic, preventive, periodontal and restorative services by the high user group were intuitively anticipated. We are unaware, however, of other long-term studies of large, insured, elderly groups. The 1988-89 dental service RVU data of Leake et al.⁸ regarding Ontario adults 50 years of age and over (only 38 per cent were over the age of 64), and the 1986 Canadian time data of House,⁹ about patients over 64 years, are not that comparable to the Alberta expenditure data reported here. Despite this, we roughly compared their percentage distributions of RVUs and time^{8,9} and our expenditures for dental services. The main observation from this comparison was that both the moderate and high user groups in Alberta received relatively more periodontal services in 1990-91 than the patients described by Leake et al.⁸ and House.⁹

Believing that relatively fewer high users were edentulous, we anticipated the findings that this group spent more for specific services — dental prophylaxis, topical

fluoride applications and periodontal scaling, for example — than the moderate user group (Table IV). We did not expect, however, that in 1990-91 as much as 13.0 per cent and 25.6 per cent of the total expenditures for dental care, for the moderate and high user groups respectively, would consist of these services.

The increases over time in relative expenditures for dental prophylaxis and the combination of topical fluoride application and dental prophylaxis by the moderate users, and for topical fluoride applications by both groups, were interesting and encouraging (Table IV). However, perhaps the most striking finding about time-related changes in preventive services was the increase in the number of individual patients in the two user groups who received both a dental prophylaxis and a topical fluoride application annually (these data are not shown in Table IV). This combination more than doubled between 1978-79 and 1990-91,

when it represented 2.9 per cent of total expenditures for the moderate user group and 6.5 per cent for the high user group. However, since our analyses were done on an annual basis, it is impossible to tell whether the dental prophylaxis and topical fluoride applications were completed at the same patient visit. For children, it has been proven that a dental prophylaxis prior to a topical fluoride application is unnecessary for the prevention of coronal dental caries.¹² However, it is unknown whether this is also true for elderly patients for whom the topical fluoride is presumably often provided to prevent root caries.

The aggregate combination of dental prophylaxis and periodontal scaling (and root planing) services accounted for 22.1 per cent of the total expenditures in 1990-91 for high users and 11.0 per cent for moderate users (Table IV). In each group, one-fifth of those expenditures for this aggregate combination

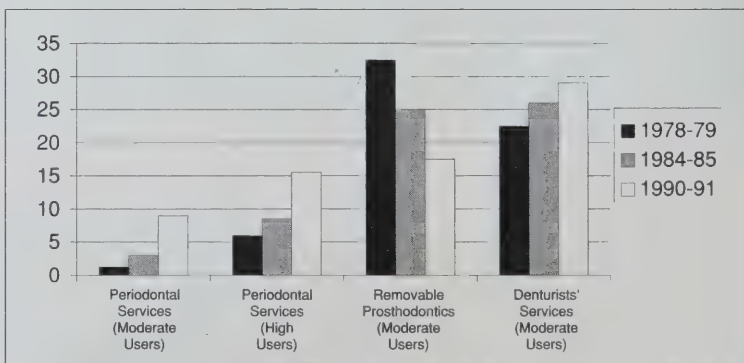


Fig. 1: Changes in percentage of total annual expenditures on selected services by moderate and high users.

involved the same patients in 1990-91.

Thus, it appears that both "tooth cleaning" procedures were provided to different patients rather than to the same patients, as some may have anticipated.

Conclusion

Compared to elderly patients who used the Alberta dental plan moderately over a 14-year period, those who used it extensively lived in the Edmonton and Calgary regions, used dentists rather than denturists for their dental care, and had relatively fewer dentures. Consistent with their greater tooth retention, the high user group received more preventive and periodontal services — mainly dental prophylaxes, and periodontal scaling and root planing. Despite the foregoing differences, the moderate user group increasingly received preventive and periodontal services and decreasingly received prosthodontic services over the period of study.

The increased utilization over time of preventive and periodontal care and the tendency to decreased prosthodontic care for these patients, who were, on average, 81 years of age in 1991-92, are a harbinger of the future dental care needs of elderly Canadians. The "new elderly," born many years later than the two groups studied here, will retain more teeth and have an even greater need

for preventive and periodontal services — and, as a result, even better oral health. ■

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ABSTRACT

Dental Unit Waterlines: Biofilm, Disinfection and Recurrence.

Timothy F. Meiller, Louis G. DePaola, Jacqueline I. Kelley, Aami Baqui. *University of Maryland at Baltimore, Dental School.*

Transmission of potential pathogens from biofilm within dental unit waterlines (DUWL) to patients has been shown to occur. *In vitro* investigations by the authors and others have shown that an 18-hour treatment of DUWL with bleach (B), glutaraldehyde (G) or Cavicide, (Micro-Aseptic Products Inc., Palatin, Ill.) (C), are effective in eliminating viable bacteria in effluent water and are effective in disrupting the biofilm mix as evidenced by culture and scanning electron microscopy (SEM). There remains concern that all remnants of the biofilm matrix may not be eliminated even with periodic treatments and the resident bacterial populations in DUWLs may recur rapidly.

In multiple trials, following an 18-hour treatment of a DUWL from a dental unit syringe with B, G or C, recurrence was investigated by: collection of 2.0 mL of effluent water on selected days over a 15 day pe-

riod; preparation of log dilutions; spread plating on trypticase soy agar; incubation at 25°C; and evaluation for growth for seven days. To compare recovered bacteria in the effluent to those in the biofilm: a segment of DUWL (1.0 cm) was excised; split lengthwise; all biofilm removed and suspended in 1.0 mL of sterile water; diluted; and plated as described above. An additional section of DUWL (0.5 cm) was removed, split, desiccated and prepared for viewing by SEM.

Baseline evaluations of DUWL determined the effluent and biofilm to harbor an average of 1×10^4 CFU/cm², respectively, prior to treatment. Treatment of 18 hours (effectively one overnight treatment) with B, G, or C rendered effluent and biofilm samples free of recoverable bacteria in all cases immediately following treatment. Viable bacteria in the effluent of B- or C-treated DUWL recurred to near pre-treatment levels by seven days. G-treated DUWL recurred in less than three days. Eighteen-hour B-

treated DUWL demonstrated inhibition of bacteria in the biofilm matrix for up to 14 days. *Pseudomonas* sp. and *Achromobacter* sp. were consistently the first to recolonize the DUWL, however, the minimum inhibitory concentrations for these isolates did not change following treatment.

Bleach, glutaraldehyde and Cavicide inhibit the recurrence of bacteria to below mature biofilm levels for up to 15 days, however, concerns over the continued presence of these potentially toxic substances in the residual biofilm matrix may preclude their regular use. ■

Study supported by the American Dental Association Health Foundation

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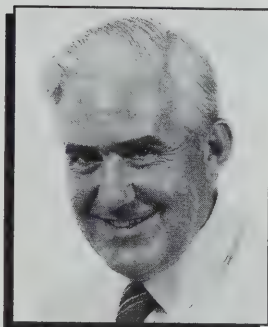
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Evidence-Based Dentistry

J.A. Hargreaves, LDS, M.Ch.D., AM, MRCD

Evidence-based medicine is being promoted for health professions, and is being critically examined and practised in adult medicine, child health, surgery, pathology, pharmacotherapy, nursing, general medical practice and dentistry. Several undergraduate, postgraduate and continuing medical and dental education programs are considering adopting the evidence-based concept and adapting it to their professions' needs.

In dental practice, evidence-based dentistry can be used to both the professional's and the patient's advantage. It involves the conscientious, explicit and judicious use of the most current evidence in making decisions about the care of *individual* patients.¹

Evidence-based dentistry integrates individual clinical expertise with the best available external clinical evidence from systematic research. Some clinicians, however, find themselves at one of two extremes. New graduates enter clinical practice knowing the most up-to-date clinical concepts, which are drawn from research in the basic sciences of dentistry and medicine. They have also been taught to use the most current methods, materials and treatments available. Yet, new graduates do not have the proficiency and judgement that clinicians acquire through many years of clinical experience and practice.

Older practitioners, while they have acquired individual clinical

experience, may not be aware of the best available external clinical evidence drawn from current systematic research. A recent survey in the U.K. found that busy medical clinicians read selectively, and that, on average, British medical consultants read for well under an hour per week.²

These findings beg the question: How much time do Canadian dental professionals spend reading current clinical research each week? There are many important topics to read about, including: the science of bonding tooth substance and materials; the modification of cavity design for new materials; the toxicology of amalgam, fluorides and other dental materials; biofilms in the dental office; the needs of different ethnic groups; and the social implications of health determinants for providing dental treatment.

When it comes to the cost of treatment, because new dentists have little personal experience with the long-term outcomes of different treatment methods, they may give more consideration to the many costly methods, when a less expensive treatment could adequately meet the patient's needs.

Rapid advances in our knowledge of the infectious nature of dental caries and periodontal disease will likely have major implications in the identification of disease risk factors and preventive measures that could be cost-effective for many patients, but not necessarily for all. This is one area that

calls for research evidence to be combined with clinical judgment for individual patients.

The value of problem-based, self-directed undergraduate education needs to be looked at critically in our dental schools — not only because it is a proven method of teaching, especially for the basic medical sciences, but also for the potential it creates for individual clinicians to continually seek current external clinical evidence.³ Life-long learning of this kind should not be motivated solely by the need to satisfy the continuing education points requirements for maintaining licensure.

A mandatory vocational year, following graduation, that would allow new dentists to work in a practice situation with an experienced clinician, has already been introduced in Britain. This concept has considerable merit. The British training program is linked to professional audits — clinical and educational — which represent another way to encourage and maintain high standards of clinical practice.

Dentistry is entering an exciting period. The prevention of dental caries through fluoridation and fluoride-containing products, the introduction of new materials for restorative dentistry, the improvements in pain control methods, and the use of implants for tooth replacement therapy have all changed the profession dramatically in recent years. In the future, the role of prevention and selec-

... continued on p. 956



SELF-LEARNING SELF-ASSESSMENT

The SLSA Program is published as a monthly feature in the *Journal of the Canadian Dental Association* as a resource for dentists wishing to enhance their dental knowledge and expertise. It is intended as a vehicle for self-learning and self-assessment. The program is based on a series of 40 questions, answers, rationales and references, followed by an annual 15-question quiz. The 1996-97 quiz will appear in the June 1997 issue of the *Journal*. Answers to the quiz will be published in the August 1997 issue. Dentists who complete the quiz may be eligible to receive continuing education points, and their names will be forwarded to their provincial licensing bodies for consideration.

Questions 11 through 15 are a repeat of the questions that appeared in the November issue of the *Journal* accompanied with correct answers, the rationales and specific references. Questions 16 through 20 are new questions — watch for the answers and rationales next month. Keep all copies of the *Journal* so you can correctly respond to the June 1997 quiz.

QUESTION 11

A patient has had a bone impacted mandibular third molar tooth removed. Since this patient will require postoperative control of pain, which of the following, when given orally, will provide the best analgesia?

- A. Acetaminophen (Tylenol) 1000 mg.
- B. Ibuprofen (Motrin) 400 mg.
- C. Acetylsalicylic acid 325 mg and codeine 30 mg.
- D. Acetaminophen 300 mg and codeine 30 mg (Empacet 30).

ANSWER: B

RATIONALE:

An ideal analgesic agent should relieve pain quickly, have at least a four hour duration of effect, and most importantly have minimal side effects. The drug must also have a high therapeutic index that permits repeated dosing at reasonable time intervals. There are several nonsteroidal anti-inflammatory drugs (NSAID's) which comply with these properties. In particular ibuprofen, acetylsalicylic acid (Aspirin) and ketorolac (Toradol) can be identified. NSAID's should not be prescribed to patients with a history of gastric or duodenal ulcers.

A review of several clinical studies that have been conducted relating to dental pain shows that ibuprofen 400 mg is superior to acetaminophen 1000 mg, ASA 650 mg plus codeine 30 mg, and acetaminophen 600 mg plus codeine 30 mg. When compared with opioid analgesic combinations, ibuprofen 400 mg was better than either ASA 650 mg with codeine 60 mg or acetaminophen 600 mg with codeine 60 mg. Another NSAID, ketorolac (Toradol) both 10 mg and 20 mg, was superior to ibuprofen. Since NSAID's inhibit prostaglandins synthesis in traumatized tissues and thus reduce pain and

edema, Jackson et al⁴ indicated that in order to maximize the analgesic benefits of NSAID's they should be prescribed on a fixed dose regimen (i.e. taken at specific intervals rather than as required).

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QUESTION 12

Examination of a 70-year-old patient with a full complement of teeth reveals periodontal pocketing of 3 mm to 5 mm, areas of loss of attachment and supra-gingival plaque throughout. Which of the following is NOT contributory to this condition?

- A. Age.
- B. Chronic gingivitis.
- C. Chronic periodontitis.
- D. Plaque.
- E. None of the above.

ANSWER: A

RATIONALE:

A recent review concluded that age is not a factor in the development of periodontitis especially when good oral hygiene is maintained.

Aging of the periodontium can be associated with some gingival shrinkage, recession, and loss of periodontal attachment and bony support of the teeth. However, these are associated with the aging process and NOT with disease. They can be considered as a norm of healthy aging similar to skin-wrinkling and decreased flexibility of joints. Such changes due to aging are NOT sufficient to lead to tooth loss. Severe periodontitis then must not be regarded as a natural consequence of becoming old.

Although it has been established that both gingivitis and periodontitis are plaque induced dental infections, it is not possible to predict which patients with gingivitis will develop destructive periodontitis. Studies have shown further that within populations, no more than seven to 15 per cent are affected with severe periodontal diseases. Furthermore, extensive bone destruction is only found in a few sites, is episodal in character in the mouth and not generalised.

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QUESTION 13

Which of the following influence the polymerization of photocured composite resin restorations?

1. Size of the curing tip.
 2. Light intensity.
 3. Thickness of the composite resin.
 4. Color of the composite resin.
 5. Time of exposure to the light.
- A. (1) (2) (5)
B. (2) (3) (5)
C. (2) (3) (4) (5)
D. (2) and (5)
E. All of the above.

ANSWER: E

RATIONALE:

Clinical success of photocured composite resins is directly dependent on the degree of polymerization. The curing light must have a sufficient output intensity (at least 200 milliwatts per square cm), correct wavelength (400-520 nanometres) and an adequate curing time for maximum polymerization. Alteration of any of the above results in a partially cured material. Water sorp-

tion and solubility increase with partial curing. This will result in decreased hardness and failure of the restoration will ensue. Polymerization is dependent also on the size of the curing tip, as well as the direction and location of the tip relative to the resin. Cavity size, resin thickness and color, affect the ability of the light to reach the deeper layers of the composite to effect the necessary cure.

Degradation of the light bulb occurs over time and this and the reflector and filters should be checked regularly. A recent study of 209 curing lights found that 30 per cent had lights with an output intensity of less than 200 milliwatts per square cm, 10 per cent had cracked or blistered filters and most units carried the original light bulb.

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QUESTION 14

A 14-year-old girl with an excellent dentition and no abnormal medical history presents with an avulsed maxillary central incisor as a result of a blow which occurred one hour ago. You would consider immediate replantation after having performed which of the following?

1. Debridement of the root surface to remove any remaining soft tissue.
 2. Rinsing of the root with saline.
 3. Amputation of the root apex.
 4. Aspiration and light irrigation of the socket with saline.
 5. Curettage of the socket.
- A. (1) and (5)
B. (1) and (4)
C. (2) and (4)
D. (2) (3) (4)
E. All of the above.

ANSWER: C

RATIONALE:

Recommended guidelines for treatment of an avulsed permanent tooth have been developed by the American Association of Endodontists. In this case, because the extraoral dry time is less than two hours, the tooth may be replanted immediately after management of the root surface and the socket as follows:

Management of the Root Surface

1. Keep the tooth moist.
2. Do not handle the root surface.
3. Do not scrape or brush the root surface.

4. Do not remove the tip of the root.
5. If the root appears clean, replant after rinsing with saline.

Management of the Socket

1. Gently aspirate without entering the socket. If a clot is present use light irrigation with saline.
2. Do not curette the socket.

REFERENCES:

- 1) Andreasen, J.O., Borum, M.K., Jacobsen, H.L. et al. Replantation of 400 avulsed permanent incisors. *Endod Dent Traumatol* 11:51-89, 1995.
- 2) American Association of Endodontists, Treatment of the Avulsed Permanent Tooth, *Recommended Guidelines of the American Association of Endodontists*, 1994.
- 3) Nikiforuk, G. *Oral Care Report*. Vol. 6, No. 1, 1996.

QUESTION 15

After replantation of the tooth in question 14, you would

- A. extirpate the pulp immediately and fill the canal with gutta percha.
- B. remove the pulp after 48 hours and medicate the canal with calcium hydroxide.
- C. remove the pulp in 7 to 14 days and medicate the canal with calcium hydroxide.
- D. remove the pulp in 7 to 14 days and fill the canal with gutta percha.

ANSWER: C

RATIONALE:

In a major study by Andreasen et al¹ in which the replantation of 400 avulsed permanent incisors was examined, some fundamental conclusions were arrived at. Immediate replantation within 30 minutes can result in efficient periodontal ligament healing and even pulpal healing of teeth with incomplete root formation. A periodontal ligament healing rate of 85 to 97 per cent can be expected and in cases of incomplete root formation, pulpal revascularization can be expected in 41 to 93 per cent of cases. When immediate replantation cannot be carried out, the study indicated no preference for storage in saliva or saline.

For this 14 year old patient where the apex of the tooth is closed and the tooth had an extraoral dry time of one hour the following guideline of the American Association of Endodontists² would apply:

Management of the Pulp

Tooth with partially to completely closed apex and less than two hours extraoral dry time:

1. Remove the pulp in 7 to 14 days.
2. Medicate the canal with calcium hydroxide.
3. After 7 to 14 days of calcium hydroxide obturate the canal with gutta percha and sealer.

REFERENCES:

- 1) Andreasen, J.O., Borum, M.K., Jacobsen, H.L. et al. Replantation of 400 avulsed permanent incisors. *Endod Dent Traumatol* 11:51-89, 1995.
- 2) American Association of Endodontists. Treatment of the Avulsed Permanent Tooth, *Recommended Guidelines of the American Association of Endodontists*, 1994.
- 3) Nikiforuk, G. *Oral Care Report*. Vol. 6, No. 1, 1996.

THIS MONTH'S FIVE NEW QUESTIONS

QUESTION 16

A mother brings to you her 10 year old daughter because of concern with crowding of the mandibular incisors. You would

- A. advise the mother that treatment should be left until the child is 16 years old.
- B. begin treatment upon eruption of the second molars.
- C. advise observation until age 18 at which time the third molars should be removed.
- D. delay treatment until the eruption of the first premolars.

QUESTION 17

Which of the following recordings of blood pressure would indicate that a patient should be referred to a physician for investigation?

Systolic pressure/Diastolic pressure

1. 120 mm Hg/80 mm Hg.
 2. 135 mm Hg/85 mm Hg.
 3. 155 mm Hg/85 mm Hg.
 4. 170 mm Hg/95 mm Hg.
 5. 190 mm Hg/100 mm Hg.
- A. (5) only
 - B. (4) and (5)
 - C. (3) (4) (5)
 - D. (2) (3) (4) (5)
 - E. All of the above.

QUESTION 18

Which of the following drugs will induce enlargement of the gingivae?

1. Nifedipine.
 2. Dilantin sodium.
 3. Entrophen.
 4. Diazepam.
 5. Cyclosporine.
- A. (1) (2) (5)
 - B. (2) and (5)
 - C. (2) (3) (4)
 - D. (2) (4) (5)

QUESTION 19

Laser is an acronym for light amplification by stimulated emission of radiation. Laser energy, regardless of wave length, is

1. absorbed by tissue.
 2. reflected off tissue.
 3. transmitted directly through tissue.
 4. scattered within tissue.
- A. (1) (2) (3)
B. (1) and (3)
C. (2) and (4)
D. (4) only
E. All of the above.

QUESTION 20

The pH of dental plaques

1. varies throughout the day.
 2. above the level of six causes fluoride ion release from the enamel.
 3. below the level of six causes fluoride ion release from the enamel.
 4. is related to the remineralisation and demineralisation reactions on the enamel.
- A. (1) only
B. (1) (2) (4)
C. (1) (3) (4)
D. (2) and (4)

(Answers to questions 11 to 15 will appear in next month's *Journal*.)

The SLSA program is a resource and service, directed to the dental profession and the licensing authorities, which is intended to help dentists achieve and maintain the high levels of expertise and competence identified by Canadian dental licensing authorities. All questions and other material are based on current, referenced literature.

Financial support for the program has been provided by A-dec, Bisco, Colgate, the Fowler-Pearce Partnership (ScotiaMcLeod), Nobel Biocare, and SciCan.

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The views expressed in the questions, answers and rationales of the SLSA program are not necessarily those of the Canadian Dental Association or its related organizations.

CDA encourages Canadian dental licensing authorities to recognize the SLSA Program as an appropriate and acceptable resource for dentists seeking to earn the continuing education credits required for the maintenance of licensure.

Currently, all 10 provincial licensing bodies — British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland — recognize the SLSA program for continuing education credits.

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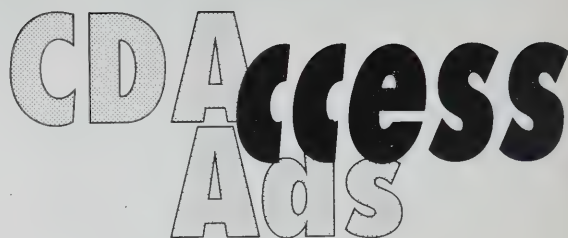
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NORTHWEST TERRITORIES - Fort Smith: An opportunity exists for a caring, conscientious associate to work one week per month at our family dental clinic in Fort Smith, N.W.T. Please reply to Box 1047, Fort Smith, N.W.T., X0E 0P0. (12/02)

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ALBERTA - Calgary: Associate wanted. Busy multi-practitioner office is seeking a motivated associate. The successful candidate will have superior endo and crown and bridge skills. Fax resume to (403) 235-6508. (11/12)

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ALBERTA - Edmonton:

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ALBERTA - Central Region:

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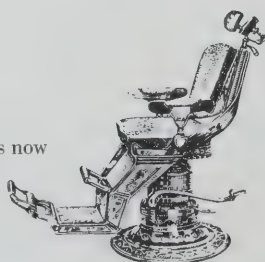
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As originally planned, the displays are changed on a regular basis to suitably depict different eras of our rich dental history. Donations of museum-quality dental artifacts are still being accepted and are very much appreciated. Particularly requested are larger items such as chairs, units, cabinets and X-ray machines, plus historical photos and records.

Also of interest to dental historians are the items highlighted in the column entitled "What's it?" which appears monthly in the *Journal*. This column elicits the help of readers in identifying some of the antique items presently on location in the museum.

For further information, contact Dr. Ralph Crawford at the Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, Ontario, K1G 3Y6. (613) 523-1770, or call toll-free 1-800-267-6354.



IT'S MY OPINION continued from p. 947 ...

tive treatment for individuals, given the idea of risk factor assessment, could change the dental profession's manpower needs. Equally important, the further integration of dentistry and medicine could affect the way dental services can be cost-effectively provided in the future.

Evidence-based dentistry can significantly advance dental health care delivery. The profession should develop this concept now, promote evidence-based medicine and dentistry through education at all levels, and encourage all groups of dental clinicians to not only share their clinical experience, but to use it along with current external clinical research findings. This will allow clinicians to reject invalidated methods and replace them with more effective and safer diagnostic and treatment regimens when making decisions for the clinical care of individual patients. ■

Dr. Hargreaves is professor emeritus at the University of Alberta and is currently undertaking research on risk factors for dental caries in pre-schoolers for Dental Health Services in the Prevention and Health Promotion branch of the British Columbia Ministry of Health.

The views expressed are those of the author, and do not necessarily reflect the opinions or positions of the Canadian Dental Association.

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2. Sackett, D.L., Surveys of self-reported reading times of consultants in Oxford, Birmingham, Milton Keynes, Bristol, Leicester and Glasgow. In: Rosenberg, W.M.C. et al. *Evidence Based Medicine*. London, Churchill Livingstone (in press).
3. Shin, J.H., Flaynes, R.B. and Johnston, M.E. Effect of problem-based, self directed undergraduate education on life-long learning. *Can Med Assoc J* 148:969-976, 1993.



INTERNATIONAL



February 8-15

Barbados Dental Association Convention. Contact Lynne Brandon (evenings). Tel.: (519) 657-4306, or fax: (519) 472-9120.

February 14-16

First International Meeting of the Egyptian Periodontal Society in Cairo. Special presentation by Professor P.I. Branemark. Contact E.P.S. First International Meeting, c/o Odyssey Travel, 31, Ministry of Agriculture St., Dokki, Cairo 12311, Egypt. Tel.: 202 348 5305, or fax: 202 349 4186, or e-mail: ruodc@rusys.EG.net

February 18-21

International Dental Expo and Conference — Indonesia '97 in Jakarta. Contact the Hong Kong (Asia) Exhibition Co. Ltd., No. 3, 7/F., Kin Tak Fung Commercial Bldg., 467-473 Hennessy Rd., Wanchai, Hong Kong. Tel.: (852) 2591 9823 or fax: (852) 2573 3311.

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April 2-7

19th Asia Pacific Dental Congress in Colombo, Sri Lanka. Contact the Congress Secretariat, c/o Sri Lanka Dental Association, 275/75 Baudhaloka Mawatha, Colombo-7, Sri Lanka. Tel./fax: (94-1) 595147.

April 3-5

International Symposium of the Treatment of Edentulous People in Geneva, Switzerland. Contact SYMPORG S.A., 7, Avenue Pictet-de-Rochemont, 1207 Geneva, Switzerland. Tel.: (022) 786 37 44, or fax: (022) 786 40 80, or e-mail: sym-porg@vtx.ch

May 21-25

9th Biennial Convention of the Caribbean Atlantic Regional Dental Association (CARDIA) in Belize City, Belize. Contact the Dental Association of Belize, P.O. Box 1418, Belize City, Belize. Tel.: 501-2-30665, or fax: 501-2-31801, or e-mail: Bennett@btl.net

June 5-7

7th International Congress on Reconstructive Preprosthetic Surgery in Copenhagen, Denmark. Contact the Congress Secretariat, Department of Oral & Maxillofacial Surgery, School of Dentistry, Faculty of Health Sciences, University of Copenhagen, 20, Nørre Allé, DK-2200 Copenhagen N, Denmark. Tel.: +45 35 32 66 11, or fax: +45 35 32 66 25.

June 5-8

1st International Dental Congress Lithuania in Vilnius. Contact VVAA Travel Agency, P.O. Box 8153, 3503 RD UTRECHT, The Netherlands.

June 9-14

73rd Congress of the European Orthodontic Society in Valencia, Spain. Contact the Secretariat, GAMA CONGRESOS, S.A., Recaredo, 31, 46001 Valencia (Spain). Tel.: 34 6 3921311, or fax: 34 6 3912020, or e-mail: gama@ctv.es

June 19-21

British Dental Association National Dental Conference in Bournemouth. Contact the Conference Office, The British Dental Association, 63 Wimpole Street, London W1M 8AL. Tel.: 0171 935 0875 (ext. 286/233), or fax: 0171 486 0855.

June 26-28

Turkish Dental Association's 4th Dental International Congress in Istanbul, Turkey. Contact the Chamber of Dentists of Istanbul, Cumhuriyet Cad. 361 / 3, 80220 Harbiye, Istanbul, Turkey. Tel.: 0.212. 296 21 05, or fax: 0.212. 296 21 04.

CANADA



January 10

Facial Pain Management Update, 1997. Speaker: Dr. Parker Mahan. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

January 11

Temporomandibular Joint Disorder. Presenters: Dr. A.K. ElGeneidy and Dr. Archie Morrison. Contact Continuing Dental Education, Faculty of Dentistry, Dalhousie University, Halifax, N.S. B3H 3J5. Tel.: (902) 494-1674, or fax: (902) 494-2527.

January 24

Soft Tissue Management — Non-surgical Periodontal Therapy. Dr. Surinder N. Bhaskar. Contact the Toronto Academy of Dentistry, 902-170 Bloor St. West, Toronto, Ont. M5S 1T9. Tel.: (416) 967-5649, or fax: (416) 967-5081.

February 1

A Review of Common Intraoral Mucosal Lesions in Brandon, Manitoba. Dr. John Perry. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 18

Pharmacology for the Dental Professional. Lecturer: Patrick Mayo. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

February 21-22

Medical Emergencies in the Dental Office. Dr. Ron Boyar. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

February 28

Excellence With the Most Recent Advances in Endodontics Today. Speaker: Dr. Clifford Ruddle. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 7-8

The Use of Automated Handpieces and Nickel Titanium Instruments in Endodontics. Dr. Carl E. Hawrish and Dr. William Christie. Contact Continuing Dental Education, Faculty of Dentistry, University of Manitoba, 780 Bannatyne Ave., Winnipeg, Man. R3E 0W2. Tel.: (204) 789-3331, or fax: (204) 888-4113.

March 14

Occlusion and Esthetics — an Oxy-moron. Speaker: Dr. Bruce Small. Contact the Calgary and District Dental Society, 76 Hawkliff Place N.W., Calgary, Alta. T3G 2S1. Tel.: (403) 239-1465.

March 20

Massage Therapy for the Dental Professional. Lecturer: Alisa Casault. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

May 4-6

2nd Trans-Pacific Endodontic Conference in Vancouver, B.C. Contact Dr. Wayne Pulver, 159 Willowdale Ave., Willowdale, Ont. M2N 4Y7. Tel.: (416) 222-9900, or fax: (416) 222-9901.

May 20

Herpes and Hepatitis. Lecturer: Dr. Barbara Romanowski. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

June 19

The Treatment of the Geriatric Patient. Lecturer: Dr. I. Kuc. Contact the Northern Alberta Dental Hygienists' Society, Continuing Education, 222, 8657-51 Ave., Edmonton, Alta. T6E 6A8. Tel.: (403) 465-1756.

July 27 - August 1

16th International Congress of Nutrition / 16^e Congrès international de nutrition in Montreal, Quebec. Contact the Congress Secretariat, IUNS '97, National Research Council Canada, Building M-19, Montreal Road, Ottawa, Ont. K1A 0R6. Tel.: (613) 993-7271, or fax: (613) 993-7250.

U.S.A.



January 23-26

22nd Yankee Dental Congress — "Pathways to Success" in Boston, Mass. Contact Dr. J. Steven Tonelli,

General Chair, Massachusetts Dental Society, 83 Speen St., Natick, Mass. 01760-4144. Tel.: (508) 651-7511.

February 14-16

Periodontal Prosthesis. Presenters: Dr. Walter Cohan and Dr. Morton Amsterdam. Contact the NOVA Southeastern University, College of Dental Medicine, 3200 South University Dr., Ft. Lauderdale, Fla. 33328. Tel.: (954) 423-1208.

March 2-9

Virgin Islands Dental Association Convention in St. Thomas. Contact Lynne Brandon (evenings). Tel.: (519) 657-4306, or fax: (519) 472-9120.

March 14

Controversies and Innovations in Implant Dentistry. Presenter: Dr. Dennis Tamow. Contact the NOVA Southeastern University, College of Dental Medicine, 3200 South University Dr., Ft. Lauderdale, Fla. 33328. Tel.: (954) 423-1208.

March 24-26

National Institute of Health Consensus Development Conference — Management of Hepatitis C in Bethesda, Md. Contact the Conference Registrar, Technical Resources International, Inc. 3202 Tower Oaks Blvd., Rockville, Md. 20852. Tel.: (301) 770-0610, fax: (301) 468-2245, or e-mail: confdept@tech-res.com

April 5-8

1997 Star of the North Meeting in Minneapolis, Minn. Contact the Minnesota Dental Association, 2236 Marshall Ave., St. Paul, Minn. 55104. Tel.: (612) 646-7454.

April 18

Dental Management of Medically Compromised Patients. Presenter: Dr. Angelo Mariotti. Contact the NOVA Southeastern University, College of Dental Medicine, 3200 South University Dr., Ft. Lauderdale, Fla. 33328. Tel.: (954) 423-1208.

June 21-27

International Association of Dento Maxillo Facial Radiology in Louisville, Ky. Held in association with the **3rd International Congress on Computed Maxillofacial Imaging.** Contact Dr. Neill Serman, Division of Oral Radiology, School of Dental and Oral Surgery, Columbia University, 630W 168 St., New York, N.Y. 10032. Tel.: (212) 305-5674, or fax: (718) 601-6836.

DENTAL MEETINGS



January 16-18

Manitoba Dental Association Annual Meeting in Winnipeg. Contact Mr. Ross McIntyre. Tel.: (204) 453-0055, or fax: (204) 453-0108.

April 4-5

CDA Board of Governors Interim Meeting in Ottawa, Ont. Contact Suzanne Burton. Tel.: 1-800-267-6354, or (613) 523-1770.

May 1-3

Ontario Dental Association Annual Spring Meeting in Toronto. Contact Diana Thorneycroft. Tel.: (416) 922-3900, or fax: (416) 922-9005.

May 8-10

Newfoundland Dental Association Annual Meeting in Gander. Contact Dr. Robert Janes. Tel.: (709) 256-3889.

May 23-24

New Brunswick Dental Society Annual Meeting in Fredericton. Contact Barbara Wishart. Tel.: (506) 452-8575, or fax: (506) 452-1872.

May 24-28

26^e Congrès annuel de l'Ordre des dentistes du Québec — Les Journées dentaires du Québec in Montréal. Contact Nicole Pagé or Ginette Boutin. Tel.: (514) 875-8511, or fax: (514) 875-1561.

May 27-June 1

91st Annual General Meeting of the Alberta Dental Association in Jasper. Contact Dr. Bob Cunningham, 304-8225, 105 Street, Edmonton, Alta. T6E 4H2. Tel.: (403) 439-3740, or fax: (403) 439-0145.

June 5-7

Prince Edward Island Dental Association Annual Meeting in Mill River. Contact Nettie Likely. Tel.: (902) 566-5199, or fax: (902) 892-4470.

Notices of meetings and continuing education courses are published without charge for appropriate **not-for-profit** dental organizations, teaching facilities or recognized study clubs. Information must be received two months prior to expected publication date, and will be published at the discretion of the editor. Send all requests c/o Ms. Rachel Gali-peau, *Journal* editorial assistant, Canadian Dental Association, 1815 Alta Vista Dr., Ottawa, Ont. K1G 3Y6.

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THE JOURNAL OF THE CANADIAN DENTAL ASSOCIATION ANNUAL INDEX Volume 62, Numbers 1-12

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Executive Search

The
Canadian Dental
Association's 1997 Convention is
shaping up to be a great meeting in western
Canada.

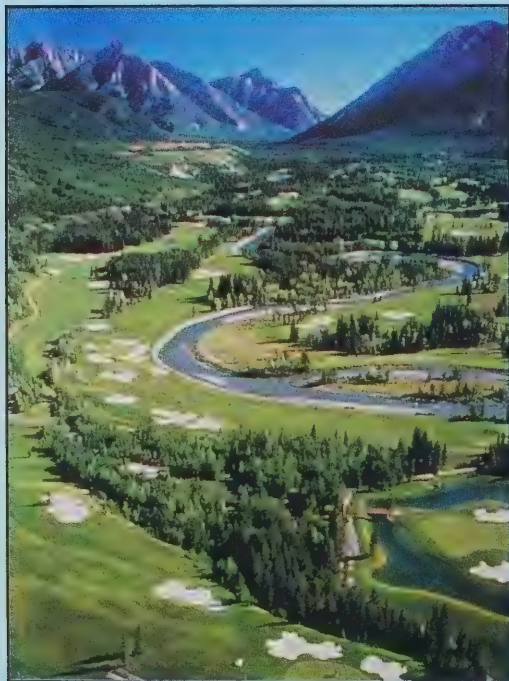
CDA '97 will take place from Thursday,
August 14 to Sunday, August 17 in Calgary.

Here's an outline of the Convention
programs and events to date.

Scientific Program

This year, more **hands-on workshops** and **limited attendance courses** will be offered at the 1997 meeting. These sessions will take place on **Thursday, August 14 and Sunday, August 17.**

Topics include: practice management, team building, aesthetic dentistry, implants, electrosurgery, emergencies in the dental office, periodontal surgery, crown and bridge, instrumentation, endodontics, and others.



The **general lectures** will take place on **Friday, August 15 and Saturday, August 16.** A broad range of topics on various aspects of dentistry will be available. The general scientific program will begin with a **keynote presentation** on a topic of general interest. All participants will be invited to attend this session. The **new dentists program** will have an abundance of useful information for the newest members of the dental profession.

The scientific program is designed for every member of the dental team.

Exhibits

The trade show will also be located at the Round-Up Centre. **The exhibits will be open on Friday and Saturday, August 15th and 16th.** Various Convention draws will take place in the exhibit hall.

For more information, contact CDA Conventions at 1-800-267-6354.

Canadian
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Association
Convention



Congrès de
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August 14 - 17
du 14 au 17 août



Venues & Hotels

The Convention will take place at the Round-Up Centre and in downtown hotels. The Round-Up Centre is the location of the annual Calgary Stampede and Rodeo. The Convention has room blocks in four downtown hotels which have been selected for participants: the Palliser, the Radisson, the Delta Bow Valley and the Westin. The Palliser will be the headquarter hotel with some events taking place at the Radisson.



Special Activities

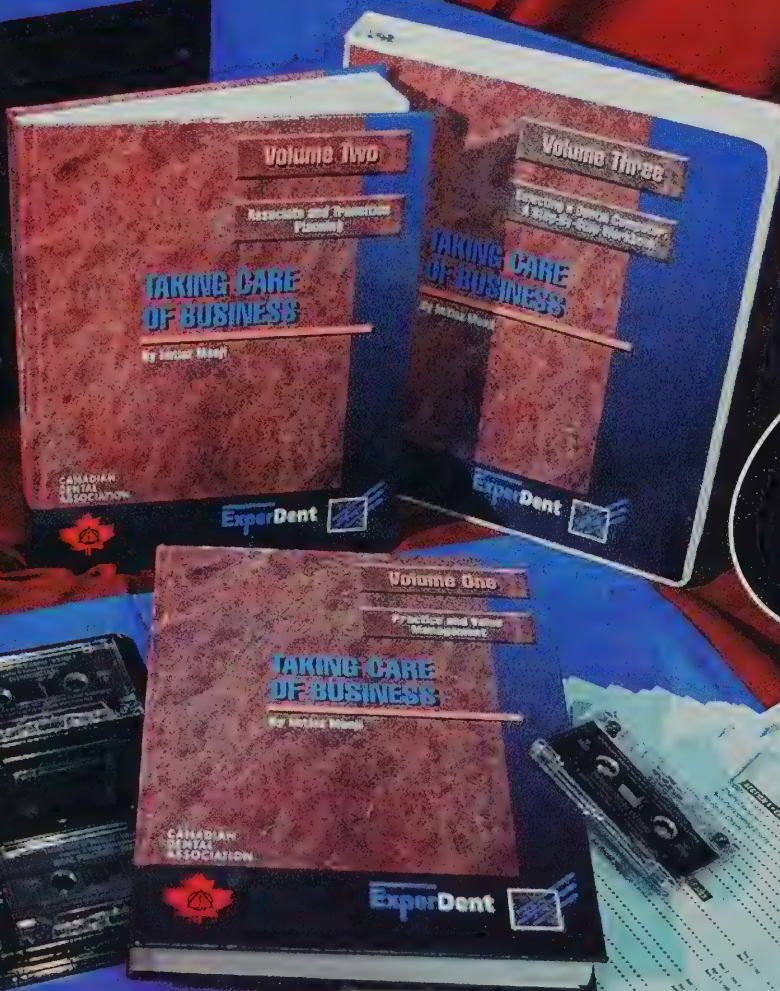
Leave a day early from the office and participate in the annual golf tournament on Wednesday, August 13th. This full day event is sure to challenge players of every level.

In true western spirit, a pancake breakfast will be served to Convention participants on Friday and Saturday. Meet your team early and begin the day with breakfast together.

Visits and tours and a children's program will also be part of the CDA Convention. Details will follow in the coming months.



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WATCH FOR IT! A NEW CLINICAL FEATURE COMING TO THE JOURNAL IN JANUARY

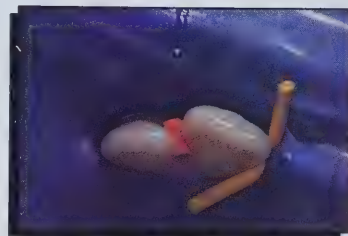
Have you found a better way to do something? Is there some little clinical or laboratory technique that you have developed that works for you, that makes that procedure more efficient and reliable? Why not share your ideas with your fellow practitioners?

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See the January *Journal* for the first in the series, *In My Practice ...*, "How to find direct access to equivocal approximal carious lesions."

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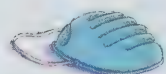
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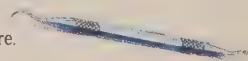


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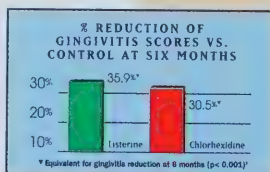
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² DeFonseca, J. Dietrich Comparative effects of two chemotherapeutic mouthrinses on the development of supragingival dental plaque and gingivitis. *J Clin Periodontol* 1990;17:575-579. [PAAB]

³ DeFonseca, J. et al. Chemotherapeutic inhibition of supragingival dental plaque and gingivitis development. *J Clin Periodontol* 1989;16:311-315.

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